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UNITED STATES DEPARTMENT OF AGRICULTURE

Forest Service

Region One

BR
REPORTS
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WHITE PINE BLISTER RUST CONTROL

Calendar Year 1955

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CONTENTS

WHITE PINE BLISTER RUST CONTROL - 1955

Forest Service

Region One

1.	Region One	1 - 11
2.	Scouting for White Pine Blister Rust	1 - 2
3.	Clearwater National Forest and Clearwater Timber Protective Association	1 - 5
4.	St. Joe National Forest and Potlatch Timber Protective Association	1 - 6
5.	Kaniksu National Forest and Priest Lake Timber Protective Association	1 - 7
6.	Coeur d'Alene National Forest	1 - 5
7.	Kootenai National Forest	1 - 3
8.	The National Park Program	1 - 7
9.	Development and Improvement - Chemical Methods - Ribes Ecology Studies	1 - 8
10.	Development and Improvement - Rust Resistant White Pine	1 - 7

1 - WHITE PINE BLISTER RUST CONTROL, REGION ONE, 1955

H. E. Swanson, Assistant Regional Forester
F. O. Walters, Forester

Objectives

The present over-all objective in the control program in Region One is directed at the protection of white pine on the following acreages:

Ownership	Acres
National Forest	851,930
Public Domain	7,880
National Parks	26,840
State	87,930
Private	172,950
Total	1,147,530

Three Programs: National Forest, State and Private, National Parks

The U. S. Forest Service in Region One provides the leadership and technical direction to the three programs. The control area in the National Forest and State and Private programs is likely to remain substantially the same for a considerable time. In the case of the National Parks program, possible additions to the control area are now being considered.

The white pine units making up the National Forest and State and Private programs were selected from the highest priority white pine areas according to the predominating class of ownership. The intermingled ownership pattern, particularly in north Idaho, accounts for the variation of acreage in the programs from the acreage in the ownership classes in the total control area.

Program	Acres
National Forest Units	940,683
State and Private Units (Idaho)	180,007
National Park Areas	26,840
Total	1,147,530

Cooperators

The active cooperators in the control program are:

U. S. Forest Service
National Park Service
State of Idaho
Clearwater Timber Protective Association
Potlatch Timber Protective Association
Priest Lake Timber Protective Association

Finances. Increase in State Contributions

Fiscal Year 1956 saw some improvement in the financing of BRC work in Region One. The State of Idaho increased its biennial appropriation from $75,000 to $135,000. The 50 percent cut made in F. Y. 1955 federal appropriations for cooperative BRC on state and private lands was restored in F. Y. 1956.

BRC EXPENDITURES, REGION ONE, CALENDAR YEAR 1955

State	712	042	432	K-V	Total	Nat'l Park Service	State & Private Funds	All Funds Total
	$	$	$	$	$	$	$	$
Idaho	89,439	709,017	75,046	16,558	890,060	-	64,853	954,913
Mont.	16,985	121,860	-	420	139,265	13,144	-	152,409
Wash.	11,477	123,214	-	5,700	140,391	-	-	140,391
Colo.	2,505	-	-	-	2,505	9,266	-	11,771
Wyo.	9,351	-	-	-	9,351	48,433	-	57,784
Totals	129,757	954,091	75,046	22,678	1,181,572	70,843	64,853	1,317,268

712 - Leadership function for all programs
042 - National forest program
432 - Federal funds for state and private program
K-V - Stand improvement collections used for BRC on national forest lands

Field Program, 1955. Per Man Day Output Greater

The over-all program had 100 fewer workers in 1955 than in 1954. This smaller force, together with unfavorable working weather during the last part of June and first part of July, was responsible for a slightly lower accomplishment (1,200 acres) in 1955. However, the effective man-day accomplishment in 1955 was 4.7 percent greater.

ORGANIZATION, 1955

Program	Camps	Employees	Contractors
National Forest	28	847	23
State and Private	5	195	2
National Parks	5	54	-
Totals	38	1,096	25

PROGRESS ON ALL RIBES ERADICATION, 1955

Program	Working	Regular Work Acres	Checker Flanker Acres	Total Acres	Man Days	Ribes	Per Acre Man Days	Per Acre Ribes
National Forest	Initial	2,620	210	2,830	4,060	1,937,000	1.43	684
	Rework	24,006	1,110	25,116	21,458	668,200	1.02	27
	Maintenance	6,664	4,250	10,914	4,502	166,800	.41	15
	Totals	33,290	5,570	38,860	30,020	2,772,000	.77	71
State & Private	Initial	1,530	-	1,530	2,110	1,095,400	1.38	716
	Rework	2,880	-	2,880	3,434	74,700	1.19	26
	Maintenance	1,190	500	1,690	776	11,900	.46	7
	Totals	5,600	500	6,100	6,320	1,182,000	1.04	194
National Parks	Initial	1,430	330	1,760	1,520	634,700	.86	361
	Rework	840	-	840	710	17,700	.85	21
	Maintenance	470	-	470	100	1,600	.21	3
	Totals	2,740	330	3,070	2,330	654,000	.76	213
All Programs	Initial	5,580	540	6,120	7,690	3,667,100	1.26	599
	Rework	27,726	1,110	28,836	25,602	760,600	.89	26
	Maintenance	8,324	4,750	13,074	5,378	180,300	.41	14
	Totals	41,630	6,400	48,030	38,670	4,608,000	.81	96

Note: Number of acres in National Forest Program worked with K-V funds: 1,406.

CHEMICAL ERADICATION, 1955

Program	Acres	Man Days	Ribes	Gallons
National Forest	2,020	3,019	2,006,500	479,790
State and Private	480	930	1,007,240	137,000
National Parks	500	1,010	552,200	37,540
Totals	3,000	4,959	3,565,940	654,330

CONTRACT RIBES ERADICATION, 1955

Program	Number of Contracts	Acres	Man Days	Ribes	Amount Paid
National Forest	39	1,880	1,113	21,170	$26,808
State and Private	2	190	90	1,000	1,721
Totals	41	2,070	1,203	22,170	38,529

RIBES ERADICATION PROGRESS, 1922-1955

(Present Control Areas - Net Acres)

Ownership	Total Acres	Initial Work Acres	Rework Acres	Unworked Acres	Maintenance Acres
National Forest	851,930	600,170	438,910	251,760	227,980
National Parks	26,840	24,820	22,280	2,020	17,130
Public Domain	7,880	7,700	7,700	180	4,500
State and Private	260,880	210,420	183,870	50,460	88,610
Totals	1,147,530	843,110	652,760	304,420	338,220

Highlights in Other BRC Activities

Wood flour showing promise as marker in chemical ribes eradication. Constant search and effort has been made over the last 25 years to find or develop a suitable marker. Wood flour, tried for the first time in 1955, appears to be quite effective if not entirely satisfactory as a residual marker on sprayed plants. It has none of the objectionable features of many materials tested and leaves a reasonable trace on the sprayed plants. This should increase efficiency and do much to eliminate misses.

Results encouraging in rust resistant white pine breeding. The progenies from the first crosses between rust resistant white pine selections are beginning to give reliable information on the occurrence and degree of inheritance of rust resistance. Results are showing that a few parent trees are consistant in transmitting some degree of resistance to all their progenies and that a few of the progenies exhibit an important amount of resistance. These promising progenies (three years old) show only one-third to one-half as many needle spots one year after inoculation as the other three-year-old progenies. Also, the same promising progenies (four years old) appear to have between 20 and 30 percent rust resistant individuals two years after inoculation.

Resistant characteristics appear in many of the progenies that become infected. Needle spots as the first indication of infection are fewer and often late in appearing; canker appearance is delayed and cankers when appearing are often abnormal with necrotic and corking areas developing. These signs indicate a struggle to stop the growth of the infection within the trees.

Microclimate studies in relation to rust behavior. There has long been a need in Region One for information on the influence of microclimate on rust behavior. For starting this work in Fiscal Year 1956, $10,000 of BRC funds were transferred to the Intermountain Forest and Range Experiment Station.

Spread of the rust. The finding of blister rust on white pine for the first time in Teton County, Wyoming, (three miles west of the Grand Teton National Park boundary) extended the known limits of the disease on pine 90 miles farther south in Wyoming. Rust was found on ribes for the first time in Bonneville County, Idaho, on West Pine Creek, representing a south extension of 10 miles beyond previously known limits of the disease.

SUMMARY OF THE NATIONAL FOREST PROGRAM, REGION ONE

Five-Year Work Plans for National Forest White Pine Units

After a thorough analysis of BRC estimated costs and white pine yields in all the national forest units, the Forest Service adopted a five-year work plan (1950-1954). The plan included 97 top priority units and provided a good operating guide and objective for the period. A review of accomplishments under the plan was made and a new plan set up for the next five-year period. An upward revision of 21.4 percent in the original estimates for the 20-year (1950-1969) effective man-day requirement on these units was necessary. The increase was largely accounted for by the unforeseen workload resulting from snow conditions (1949-1950), which caused breakage and upturning of trees in dense pole stands - already on maintenance - in many areas in the region. Planning on the basis of present financing, the 1955-1959 work plan provides for all work required during the period on the first 97 units plus the work on 38 additional units. The addition includes all units rating protection on which control work should be started in this five-year period. The new units are largely in sawtimber where logging operations have been or will be started in the next five years.

Expenditures, Calendar Year 1955

Forest	712 Funds	042 Funds	K-V Funds	Totals
Clearwater*	$ 8,708	$104,941	$ 5,787	$119,436
St. Joe*	14,933	298,234	132	313,299
Kaniksu*	16,000	303,100	12,700	331,800
Coeur d'Alene	8,485	148,342	3,639	160,466
Kootenai	4,875	48,060	420	53,355
Totals	$53,001	$902,677	$22,678	$978,356

*Also had cooperative program on state and private lands.

Organization, 1955

Forest	Camps	Employees	Contractors
Clearwater	2	105	-
St. Joe	9	295	3
Kaniksu	9	270	12
Coeur d'Alene	5	135	8
Kootenai	3	42	-
Totals	28	847	23

Ribes Eradication Progress, 1955

Forest	Initial Work Acres	Rework Acres	Total Worked Acres	Man Days	Ribes	Per Acre Man Days	Per Acre Ribes
Clearwater	250	2,480	2,730	2,810	197,000	1.03	72
St. Joe	690	11,380	12,070	11,130	1,366,000	.92	113
Kaniksu	1,170	16,170	17,340	9,750	851,000	.56	49
Coeur d'Alene	440	3,570	4,010	5,030	313,000	1.25	78
Kootenai	280	2,430	2,710	1,300	45,000	.48	17
Totals	2,830	36,030	38,860	30,020	2,772,000	.77	71

Control Status on National Forest Units, 1955
(Acres)

Forest	Unworked	Needing Rework	Needing Post Check	On Maintenance	Total Control Area
Clearwater	94,870	26,310	47,980	28,880	198,040
St. Joe	1,300	34,300	36,200	53,000	124,800
Kaniksu	29,634	24,730	80,258	98,521	233,143
Coeur d'Alene	87,100	52,100	96,700	44,700	280,600
Kootenai	54,000	5,400	10,100	34,600	104,100
Totals	266,904	142,840	271,238	259,701	940,683

National Forest Units, Region One

Summary of Ownership, 1955

Ownership	Acres
Federal	837,063
State	25,430
Private	78,190
Total	940,683

National Forest Units, Region One

Summary of Control Status by Age Classes, 1955

Origin of Stand	Total Acres	Unworked Acres	Needing Rework Acres	Needing Post Check Acres	On Maintenance Acres
1940-1959	59,916	17,595	10,890	14,229	17,202
1920-1939	202,934	37,184	31,910	57,361	76,479
1900-1919	136,585	13,955	29,432	43,603	49,595
Older Pole	169,043	38,005	18,975	49,582	62,481
Mature	372,205	160,165	51,633	106,463	53,944
Totals	940,683	266,904	142,840	271,238	259,701

SUMMARY OF STATE AND PRIVATE PROGRAM, REGION ONE

Work Plans for State and Private White Pine Units

State and private units included in the cooperative program have received a thorough analysis similar to that given the national forest units. High priority units were selected on which considerable control work had already been performed and on which it was estimated that the remaining work could be spread over the next 20 years. The forests handling the cooperative program are now preparing detailed work plans for the 1955-1959 period. On the present level of financing, it is not possible to keep ribes eradication on schedule in all units. It may be necessary to make some adjustments in units in order to get the work properly timed. There is a greater need for funds on the units now in the program during the first part of the 20-year period than during the last part.

Expenditures, Calendar Year 1955

Source	Clearwater T. P. A. (Clw. N. F.)	Potlatch T. P. A. (St. Joe N. F.)	Priest Lake T. P. A. (Kaniksu N. F.)	Totals
Federal Funds				
Leadership 712	$ 6,943	$ 3,970	$ 1,500	$ 12,413
Control 432	27,939	29,387	17,720	75,046
Subtotals	34,882	33,357	19,220	87,459
S&P Coop. Funds				
Idaho State	22,917	17,193	5,670	45,780
T. P. A.	10,691	8,382	-	19,073
Subtotals	33,608	25,575	5,670	64,853
Total All Funds	$68,490	$58,932	$24,890	$152,312

Organization, 1955

Area	Camps	Employees	Contractors
Clearwater T.P.A.	2	105	-
Potlatch T.P.A.	2	80	-
Priest Lake T.P.A.	1	30	2
Totals	5	215	2

Ribes Eradication Progress, 1955

Area	Initial Work Acres	Rework Acres	Total Worked Acres	Man Days	Ribes	Per Acre Man Days	Per Acre Ribes
Clearwater T.P.A.	540	1,030	1,570	2,550	255,000	1.62	162
Potlatch T.P.A.	990	1,580	2,570	2,890	913,000	1.12	355
Priest Lake T.P.A.	-	1,960	1,960	880	14,000	.45	8
Totals	1,530	4,570	6,100	6,320	1,182,000	1.04	194

Control Status on State and Private Units, 1955
(Acres)

Area	Unworked	Needing Rework	Needing Post Check	On Maintenance	Total Control Area
Clearwater T.P.A.	19,730	14,470	14,240	21,520	69,960
Potlatch T.P.A.	9,900	18,800	14,500	23,100	66,300
Priest Lake T.P.A.	5,866	4,353	16,759	16,769	43,747
Totals	35,496	37,623	45,499	61,389	180,007

State and Private Units, Region One

Summary of Ownership, 1955

Ownership	Acres
State	62,460
Private	94,760
Federal	22,787
Total	180,007

State and Private Units, Region One

Summary of Control Status by Age Classes, 1955

Origin of Stand	Total Acres	Unworked Acres	Needing Rework Acres	Needing Post Check Acres	On Maintenance Acres
1940-1959	37,608	25,010	6,275	5,616	707
1920-1939	62,893	3,990	16,792	15,694	26,417
1900-1919	30,547	280	4,780	9,760	15,727
Older Pole	12,173	2,006	1,280	5,427	3,460
Mature	36,786	4,210	8,496	9,002	15,078
Totals	180,007	35,496	37,623	45,499	61,389

2 - SCOUTING FOR WHITE PINE BLISTER RUST, 1955

J. C. Gynn, Forester, and C. M. Chapman, Forester

Extensive scouting for white pine blister rust was performed in Montana, Wyoming, northern Colorado, northeastern Utah, and southeastern Idaho. Rust on white pine was found for the first time in Teton County, Wyoming, three miles west of the Grand Teton National Park boundary. This find extends known limits of the disease on white pine 90 miles farther south in Wyoming. Infected white pine centers were found spreading into the Blackfoot Indian Reservation in Montana immediately adjacent to previously known limits of pine infection. Inspections in the Green and Seven Devil Mountains showed the disease is spreading and intensifying on white bark pine in Idaho County, Idaho.

Rust was found on ribes for the first time in Bonneville County, Idaho, on West Pine Creek. This extends known limits of the disease 10 miles farther south in Idaho.

All other infections found in 1955 were in the vicinity of previously reported infection centers. No white pine blister rust has yet been found in Colorado or Utah.

WHITE PINE INFECTION LOCATIONS

Teton County, Wyoming: Targhee National Forest, Darby Creek, three miles west of Grand Teton National Park, T. 43 N., R. 118 W., Sec. 14. The host Pinus flexilis was infected with fruiting canker in 1946 wood.

Glacier County, Montana: Blackfeet Indian Reservation, Two Medicine Creek, four miles east of Glacier Park Station, T. 32 N., R. 12 W., Sec. 27. The host P. flexilis was infected with fruiting cankers.

RIBES INFECTION LOCATION

Bonneville County, Idaho: Targhee National Forest, West Pine Creek, 10 miles southwest of Victor, T. 3 N., R. 44 E., Sec. 29. The infected host was Ribes inerme.

SCOUTING SUMMARY, 1955

Location	Drainages Scouted	Ribes Examined	Pine Examined	New Infection Centers	
				Pine	Ribes
Montana					
Gallatin N. F.	2	150	50		
Blackfeet Indian Reservation	1	50	50	1	1
Wyoming					
Yellowstone N. P.	6	1,500	1,950		
Teton N. F.	1	50	90		
*Medicine Bow N. F.	5	730	370		
Grand Teton N. P.	4	730	960		
Shoshone N. F.	7	540	930		
Targhee N. F.	1	20	50	1	
Idaho					
Caribou N. F.	3	430			
Targhee N. F.	1	470			1
Colorado					
Rocky Mountain N. P.	8	750	210		
*Roosevelt N. F.	10	1,020	220		
*Routt N. F.	3	320			
Utah					
*Cache N. F.	5	190			
*Dinosaur N. M.	1	20			
*Uinta N. F.	5	60			
Totals	63	7,030	4,880	2	2

*Pinon rust found. Indicates favorable conditions for white pine blister rust.

3 - BLISTER RUST CONTROL, CLEARWATER NATIONAL FOREST, 1955

M. C. Riley, Project Officer
D. F. Williams, Assistant Project Officer

I. INTRODUCTION

The 1955 program was on approximately the same scale as last year. Two camps and a small spray crew operated on national forest units. In the cooperative program on the Clearwater Timber Protective Association, two camps worked from three locations on state and private units.

The blister rust control activities were confined to protection of white pine stands within present program units where maximum future volumes can be protected at lowest cost.

II. 1955 FIELD PROGRAM

This was the first year under the second five-year plan for national forest lands. A similar plan has been prepared for state and private units. The extremely late spring delayed camp occupancy which caused some change in original plans. Accomplishments were only about 90 percent of that planned for 1955. No appreciable time was lost because of firefighting duties.

After the close of the eradication season, a BRC project road of approximately 3½ miles was constructed to make more accessible the excellent white pine pole stands in lower Fan and Trout Creeks.

1. Expenditures, Calendar Year 1955

Source of Funds	National Forest Program Idaho	State & Private Program Idaho	Total Program Idaho
Federal			
Leadership	$ 8,708	$ 6,943	$ 15,651
Control	104,941	27,939	132,880
K-V	5,787	-	5,787
Subtotals	119,436	34,882	154,318
Cooperative			
State	-	22,917	22,917
C.T.P.A.	-	10,691	10,691
Subtotals	-	33,608	33,608
Totals	$119,436	$68,490	$187,926

2. Organization, 1955

The general organization followed the same lines as last year. The increasing amount of timber sales in white pine units and the need for coordinating blister rust control and timber management plans for such areas required considerable attention by the BRC project officer. It was necessary for the assistant project officer to take full charge of the camp field program while Robert F. Weholt, unit supervisor, supervised the checking and survey program.

Program	Camps	Employees	Contractors
National Forest	2	105	None
State and Private	2	85	None
Totals	4	190	None

3. Progress on All Ribes Eradication, 1955

One national forest camp located in Unit 23, Alder Creek, completed needed rework on the two Alder Creek plantations and started final rework in the plantation in Unit 27, Beaver Creek. No further work will be needed on these areas covered in 1955 unless some disturbance occurs. The camp in Unit 58, French Creek, extended the work done in previous years in that high value pole stand. While waiting until this camp could be occupied, the crew worked from the Musselshell brush camp in Unit 55, Dan Lee-Swede Creek. Future work in Unit 58 will be greatly facilitated by the road now being built in French Creek. A five-man crew, using a truck-mounted power sprayer, did roadside spray work on K-V areas in Unit 10, Gold Creek; Unit 15, Orofino Creek; and Unit 53, Bradford. Work in these units was not completed because cedar operations are still in progress.

On state and private lands, the Hildebrand camp worked in Unit 6 cleaning up blocks near the south end of the unit where current post check revealed needed rework. The crew from this camp also continued final rework on Orofino Creek from Rhodes Creek towards the forest boundary. The second camp was located in Unit 18, Deer Creek, until all presently needed rework was completed. The crew then moved to Unit 20, Washington Creek, to continue the spray work started in 1954. In addition, crews from this camp completed the hand eradication work around the areas sprayed in 1954. The practice of doing hand eradication work one year after chemical work on blocks needing both types of treatment seems most satisfactory. A five-man power spray crew was used in Unit 6 for a short time to spray a small ribes concentration resulting from recent relogging.

All workers were given the usual chart and field practice training and an indoctrination course with more than the usual stress being placed on safety. All field personnel were given fire training by district rangers.

Program	Working	Regular Work Acres	Man Days	Ribes	Per Acre Man Days	Per Acre Ribes
National Forest	Initial	250	120	146,000	.48	584
	Rework	2,480	2,690	51,000	1.08	21
	Totals	2,730	2,810	197,000	1.03	72
State and Private	Initial	540	730	234,000	1.35	433
	Rework	1,030	1,820	21,000	1.77	20
	Totals	1,570	2,550	255,000	1.62	162
All Programs	Initial	790	850	380,000	1.08	481
	Rework	3,510	4,510	72,000	1.28	21
	Totals	4,300	5,360	452,000	1.25	105

Note: Number of acres in National Forest Program worked with K-V funds was 430 acres.

4. Chemical Ribes Eradication, 1955

Full use was made of chemicals including the decapitation method and knapsack sprayers. Two truck-mounted power sprayers were operated on Washington Creek and one on the K-V areas. Portable sprayers were used on French Creek. From three to six nozzles were employed on each power sprayer.

Wood flour was used as a marker for most of the season. This material mixes readily, has no deteriorating effect on hose or machinery and remains on bushes adequately so that the efficiency of bush coverage can be determined. Workers realize a benefit since they can more easily determine which bushes have been treated.

Data on chemical eradication is as follows:

Program	Acres	Man Days	Ribes	Gallons
National Forest	210	170	131,000	9,800
State and Private	230	450	231,000	59,800
Totals	440	620	362,000	69,600

5. Contract Ribes Eradication, 1955

No bidders were available for ribes eradication contracts although efforts were made to continue this phase of the program. Former contractors were college students, but none returned in 1955. Considerable area on the Clearwater National Forest best lends itself to contracting and efforts to secure bidders will be continued.

III. CONTROL STATUS

1. Checking and Surveys

A checking and survey force of 14 men provided one or two checkers for each camp and a post check and stocking-disease survey crew for the entire season. All stabilized areas worked were placed on maintenance. Except where ribes seedlings were present all areas were worked to maintenance standards.

Post check was conducted on 7,510 acres in seven national forest units and on 2,380 acres on three state and private units. This brings the post check program practically up to date and at the end of next season all post check will be on schedule.

A total of 6,360 acres was examined in the stocking-disease survey work on four units each of national forest and state and private lands. On rechecking strips originally surveyed in 1949 and 1950, no appreciable buildup of blister rust was evident. Although results have not been fully evaluated, indications are that no areas will be regraded because of changes in stocking or disease conditions.

2. Summary of Ownership and Control Status

NATIONAL FOREST UNITS

Work on national forest units is progressing more nearly on schedule since reappraisal has been made for the current five-year period. The late spring reduced accomplishments somewhat but with the more funds remaining for next spring it is expected that this deficiency will be erased. Stabilized areas are being placed on maintenance and satisfactory progress is being made. The new project road into Fan Creek will greatly reduce travel time for crews working in the pole stands in Fan and Trout Creeks which is planned for next season.

Work financed by K-V collections is increasing each year. In some cases, cedar pole operations are delaying the blister rust control work beyond the proper timing. This situation is being remedied as fast as possible and thus far constitutes no major handicap to the program. It is expected that next year the equivalent of one full camp season will be expended on K-V areas.

STATE AND PRIVATE UNITS

All work on stabilized areas results in meeting maintenance standards except for the initial work being done in Washington Creek. Disease survey results show that there is no appreciable increase in blister rust losses where work is on schedule.

A reappraisal of work needs on state and private units, just completed, shows that present financing is inadequate to meet the immediate work requirements on all high priority units and to get the program on a properly timed work schedule. Steady progress is being made on all units where previous work has been done. The rework load is decreasing as areas are worked to maintenance standards. Under present financing, no new work can be undertaken in such units as Snake Creek and Reeds Creek for a number of years. The delay will materially increase costs of protecting future white pine volumes on these units.

Summary of Ownership

Ownership	National Forest Units (Acres)	State & Private Units (Acres)	All Units (Acres)
Federal	179,060	3,380	182,440
State	4,140	15,440	19,580
Private	14,840	51,140	65,980
Totals	198,040	69,960	268,000

Summary of Control Status

Control Status by Age of Stand	Total Acres	Unworked	Needing Rework	Needing Post Check	On Maintenance
National Forest Units:					
1940-1959	22,730	14,070	5,190	2,080	1,390
1920-1939	24,640	13,690	3,520	4,540	2,890
1900-1919	25,920	6,580	8,000	5,560	5,780
Older Pole	16,070	6,330	2,650	4,200	2,890
Mature	108,680	54,200	6,950	31,600	15,930
Totals	198,040	94,870	26,310	47,980	28,880
State & Private Units:					
1940-1959	21,480	16,130	3,970	1,360	20
1920-1939	24,000	3,530	6,230	7,500	6,740
1900-1919	3,390	70	2,260	900	160
Older Pole	3,860	-	1,070	380	2,410
Mature	17,230	-	940	4,100	12,190
Totals	69,960	19,730	14,470	14,240	21,520
Grand Totals	268,000	114,600	40,780	62,220	50,400

4 - BLISTER RUST CONTROL, ST. JOE NATIONAL FOREST, 1955

C. J. Miller, Project Officer
W. F. Painter, Assistant Project Officer

I. INTRODUCTION

All of the blister rust control work performed was directed toward protection of the immature white pine stands within the present control program. The 1955 ribes eradication program was concentrated within the high priority units near Clarkia and Bovill, Idaho.

Effective September 1, 1955, Clyde J. Miller replaced Homer J. Hartman as staffman in charge of blister rust control work. Mr. Hartman was assigned to the Coeur d'Alene National Forest as district ranger at Wallace, Idaho.

II. 1955 FIELD PROGRAM

1. Expenditures, Calendar Year 1955

Source of Funds	National Forest Program Idaho	State & Private Program Idaho	Total Program Idaho
Federal			
Leadership	$ 14,933	$ 3,970	$ 18,903
Control	298,234	29,387	327,621
K-V	132	-	132
Subtotals	313,299	33,357	346,656
Cooperative			
State	-	17,193	17,193
P.T.P.A.	-	8,382	8,382
Subtotals	-	25,575	25,575
Totals	$313,299	$58,932	$372,231

2. Organization, 1955

The St. Joe blister rust control program was supervised by the forest BRC staffman. The assistant, W. F. Painter, was in charge of all checking, surveys, and the eradication contract program. Two unit supervisors, John D. Sandmeyer and Ralph D. Kizer, directed the field activities of the 11 camps. Two of the camp foremen were full-time employees; the remainder were seasonal employees who had considerable BRC experience.

Program	Camps	Employees	Contractors
National Forest	9	295	3
State and Private	2	80	0
Totals	11	375	3

3. Progress on All Ribes Eradication, 1955

The nine national forest camps performed work within the following units: Slate (62A), Little Sand (163), West Fork Charlie (117C), Willow-West Emerald (128), Cedar-Blair (129), Clarkia (130), Feather-Porcupine (179), Nat Brown-Purdue (180), Lone Meadow (193), and Moose (177). The eradication work within the Little Sand, Lone Meadow, and Feather-Porcupine units was concentrated on removal of ribes from the pole stands. These ribes were present as a result of the 1949 and subsequent snow damage to the 41- to 60-year old pole stands. The eradication work within the remaining units was directed toward removal of ribes along the streams and on scattered patches of upland where post check indicated rework was necessary.

The ribes eradication work on 36 acres of recent cutover lands within the Willow-West Emerald unit was financed from K-V funds.

The two state and private camps were located within the East Fork Potlatch drainage. Eradication work was performed on the following units: Fry Creek (181A), Bloom Meadows (185A), and Badger Meadows (185B). The hand eradication crews and three truck-mounted power sprayers removed ribes from the recently logged areas. Continued ribes seed germination on the disturbed areas will necessitate additional workings before a maintenance standard is reached. Selective logging operations are being continued within the East Fork Potlatch units. It is planned to have eradication crews remove the ribes from the cutover lands in three to four years following the logging operation.

A satisfactory labor supply, consisting mostly of college students, was available during the month of June. The personnel turnover was very light and the workers remained on the job longer than usual. This more satisfactory situation can be attributed to the new tax law which permits a college student to earn more than $600 and still be classified as a dependent and to the fact that recruiting is now given more emphasis in rural areas.

Heavy rains interrupted the field work during the latter part of June and the first two weeks of July. The remainder of the season was extremely dry with no rainfall recorded during the month of August. Few man days were lost to fire suppression work.

Accomplishments for 1955 are shown in the following table:

Program	Working	Regular Work Acres	Man Days	Ribes	Per Acre Man Days	Per Acre Ribes
National Forest	Initial	690	1,520	1,225,800	2.20	1,777
	Rework	11,380	9,610	140,300	.84	12
	Totals	12,070	11,130	1,366,100	.92	113
State and Private	Initial	990	1,380	861,900	1.39	871
	Rework	1,580	1,510	51,600	.96	33
	Totals	2,570	2,890	913,500	1.12	355
All Programs	Initial	1,680	2,900	2,087,700	1.73	1,243
	Rework	12,960	11,120	191,900	.86	15
	Totals	14,640	14,020	2,279,600	.96	156

Note: Number of acres in National Forest Program worked with K-V funds: 36.

4. Chemical Ribes Eradication, 1955

Five truck-mounted power sprayers were used for chemical ribes eradication during the 1955 season. Three trucks were in operation on the state and private units within the Bloom Meadow unit near the head of Rogers Creek and 71 acres in the Badger Meadow unit near Mallory Creek. National forest crews used two trucks to spray 70 acres of a very heavy concentration of brush and ribes near the head of Hidden Creek within the Clarkia unit.

A very satisfactory kill is being attained on all spray areas. Some ribes seed germination is occurring where spray operations disturbed the soil and where extremely heavy concentrations of ribes were sprayed.

All spray crews used wood flour mixed with the chemical as an aid in marking sprayed bushes. The marker helped the sprayers and supervisors detect missed and poorly sprayed bushes.

Chemical ribes eradication is summarized in the following table:

Program	Acres	Man Days	Ribes	Gallons
National Forest	70	390	930,500	93,050
State and Private	250	480	776,240	77,200
Totals	320	870	1,706,740	170,250

5. Contract Ribes Eradication, 1955

There were only two experienced contractors interested in ribes contracting in 1955. It was necessary to advertise two areas twice before acceptable bids were submitted. Two contracts of 52 and 33 acres were awarded in late May. Both contracts were completed by September 1, 1955. A third contract of 41 acres was awarded in August. This contract was not completed. An extension was granted to August 31, 1956. The average bid price for the three contracts was $31.83.

An all out effort has been made to expand the contract program. Experienced ribes workers seem to be content with their bi-weekly wage and do not care to accept the risks of contract work.

Program	Number of Contracts	Acres	Man Days	Ribes	Amount Paid
National Forest	2	90	103	370	$2,647

III. CONTROL STATUS

1. Checking and Surveys

Of the total checking man days 65 percent were spent on post check. However, regular check was maintained within the camps working stabilized ribes areas. Areas treated with chemical and those with numerous seedlings present were not checked. Two checking studies were performed along with regular check activities. Both studies were conducted as outlined by H. E. Swanson.

A stocking and disease survey was made on 8,400 acres in the Marble and Hatton Creek areas. These data will provide the needed information to make an appraisal of the blister rust damage in the areas and to determine what future work, if any, should be planned in the units surveyed. Final results of the data have not been summarized.

2. Summary of Ownership and Control Status

NATIONAL FOREST UNITS

The revision of the second five-year plan for the period 1955-1959 for the 20-year program was completed in March 1955. There are now 27 active Group I units in the national forest program, with a total of 124,800 acres. There are no Group II units included in the second five-year program. (Group II units would be areas in Bird, Malin, Eagle, Quartz, Tumbledown, Bruin, Gold, and Simmons Creek drainages. No future control work is planned for any of these areas.)

An upward revision for the effective man-day needs was necessary for the 1955-1959 period. This increase was largely accounted for by the additional workload resulting from snow damage during the winters of 1948-1949 and 1949-1950 which caused the falling and upturning of trees in the pole stands. This disturbance caused heavy ribes seed germination and growth, and at least three workings will be required to restore the areas to their former maintenance status.

A minimum amount of logging has occurred within the national forest units. K-V money is being collected and used for ribes eradication work on all logged areas on national forest lands within the units.

STATE AND PRIVATE UNITS

A five-year plan for 1955-1959 for the state and private units was completed in November 1955 and submitted to the regional forester for approval. There are 16 units with a total of 66,300 acres in this program.

The majority of the work planned for the next five years will be on the four cutover units in the East Fork of Potlatch Creek drainage and the three units of reproduction and pole near Elk River, Idaho.

The logging of privately owned tracts of mature timber within and adjacent to the protected areas, with no view toward limiting ribes seed germination, is a problem within the state and private units. The ribes which usually occur subsequent to these logging operations present a hazard to the immature white pine stands.

A careful analysis should be made of state and private units that contain federal lands which, due to lack of funds, are not getting the needed blister rust protection. It may be administratively desirable to transfer some of these units or portions thereof to the national forest program to assure their protection.

The following tables give the ownership and status of the present program units:

Summary of Ownership

Ownership	National Forest Units (Acres)	State & Private Units (Acres)	All Units (Acres)
Federal	85,300	13,000	98,300
State	12,400	16,600	29,000
Private	27,100	36,700	63,800
Totals	124,800	66,300	191,000

Summary of Control Status

Control Status by Age of Stand	Total Acres	Unworked	Needing Rework	Needing Post Check	On Maintenance
National Forest Units:					
1940-1959	7,800	700	2,100	3,200	1,800
1920-1939	60,600	300	13,100	12,600	34,600
1900-1919	28,800	-	7,200	8,300	13,300
Older Pole	24,600	300	9,000	12,000	3,300
Mature	3,000	-	2,900	100	-
Totals	124,800	1,300	34,300	36,200	53,000
State & Private Units:					
1940-1959	14,500	8,500	2,100	3,800	100
1920-1939	28,300	200	8,100	5,200	14,800
1900-1919	15,300	-	2,000	5,100	8,200
Older Pole	-	-	-	-	-
Mature	8,200	1,200	6,600	400	-
Totals	66,300	9,900	18,800	14,500	23,100
Grand Totals	191,100	11,200	53,100	50,700	76,100

5 - BLISTER RUST CONTROL, KANIKSU NATIONAL FOREST, 1955

H. J. Viche, Project Officer
H. J. Faulkner, Assistant Project Officer

I. INTRODUCTION

Blister rust control was continued on lands of the Kaniksu National Forest on approximately the same scale as that of the past several years. Control work on state and private lands increased over 1954 due to increased financing of this program. Accomplishments in 1955 also improved due to more favorable weather conditions and continued improvements in methods. The achievement per man day increased 28 percent over 1954.

II. 1955 FIELD PROGRAM

Nineteen hundred fifty-five marked the first year of a new five-year program. During the winter of 1954-1955, progress and accomplishments for the past five years were summarized and a new five-year program prepared for national forest units. A new five-year program was also prepared during the year for state and private units. Acreage goals established during the past winter for 1955 were reached, but work was accomplished with fewer man days than estimated.

The project operated for the fourth consecutive season without a lost time accident. A total of 713,000 man hours have been worked since the last lost time accident occurred.

During 1955 a total of 124 acres was planted in three units. An additional 20 acres of control burning was accomplished. In the Blickensderfer unit 100 acres were prepared for a control burn in 1956.

Source of Funds	National Forest Program				State & Private Program	Total Program			
	Idaho	Mont.	Wash.	Total	Idaho	Idaho	Mont.	Wash.	Total
Federal									
Leadership	$ 6,900	$ 3,300	$ 5,800	$ 16,000	$ 1,500	$ 8,400	$ 3,300	$ 5,800	$ 17,500
Control	121,000	67,100	115,000	303,100	17,720	138,720	67,100	115,000	320,820
K-V	7,000	-	5,700	12,700	-	7,000	-	5,700	12,700
Subtotals	134,900	70,400	126,500	331,800	19,220	154,120	70,400	126,500	351,020
Cooperative									
State	-	-	-	-	5,670	5,670	-	-	5,670
P.L.T.P.A.	-	-	-	-	-	-	-	-	-
Subtotals	-	-	-	-	5,670	5,670	-	-	5,670
Totals	$134,900	$70,400	$126,500	$331,800	$24,890	$159,790	$70,400	$126,500	$356,690

2. Organization, 1955

Five camps were located in Idaho, three in Washington, and two in Montana. Two of the Idaho camps were in the Pack River drainage. The other three plus the Washington camps were in the Priest River Valley. The two Montana camps were located in the Robin Run and South Fork of Martin Creek drainages on the Trout Creek District. Eradication work, including the contracting program, was performed in 34 working units. The field organization included, in addition to the project and assistant project officer, the following positions:

a. Three unit supervisors in charge of two to four camps.

b. A supervisor in charge of all activities of the contracting program.

c. A camp superintendent, foreman, one strawboss, one checker, a cook and flunky, and 24 laborers in a standard 30-man camp. A power spray unit consisting of pump operator and four nozzle men were attached to some camps.

Program	Camps	Employees	Contractors
National Forest	9	270	12
State and Private	1	30	2
Totals	10	300	14

3. Progress on All Ribes Eradication, 1955

Planned work assignments were successfully completed in all camps. Four of the national forest camps completed all currently required work in the vicinity. The other five camps have one or more season's work planned from their present locations. The state and private camp completed work in Fox Creek unit. Four new camp sites were prepared for the 1956 season.

Work financed from K-V funds increased from 206 acres worked with an expenditure of 112 man days in 1954 to 600 acres with 480 man days.

Program	Working	Regular Work Acres	Checker Flanker Acres	Total Acres	Man Days	Ribes	Per Acre Man Days	Per Acre Ribes
National Forest	Initial	1,170	-	1,170	1,480	348,000	1.3	297
	Rework	5,036	300	5,336	3,808	337,000	.7	63
	Maintenance	6,624	4,210	10,834	4,462	166,000	.4	15
	Totals	12,830	4,510	17,340	9,750	851,000	.6	49
State & Private	Initial	-	-	-	-	-	-	-
	Rework	270	-	270	104	2,100	.4	8
	Maintenance	1,190	500	1,690	776	11,900	.5	7
	Totals	1,460	500	1,960	880	14,000	.4	7
All Programs	Initial	1,170	-	1,170	1,480	348,000	1.3	297
	Rework	5,306	300	5,606	3,808	339,100	.7	60
	Maintenance	7,814	4,710	12,524	5,342	177,900	.4	14
	Totals	14,290	5,010	19,300	10,630	865,000	.6	45

Note: Number of acres in National Forest Program worked with K-V funds: 600.

4. Chemical Ribes Eradication, 1955

The use of chemical methods of ribes eradication has increased each year since the advent of the hormone spray, 2,4,5-T. Of the total effective man days, 17 percent was expended on chemical eradication. Five truck-mounted and four portable power sprayers were used during the season. One Bean-Cutler unit was mounted on a one-half ton pickup truck and used for roadside and spot spraying on recent cutover areas. Backpack units were also used effectively where the size of the job did not warrant the use of power equipment.

Spraying was completed in the Diamond Creek unit. The Kalispell Rock project spray road was extended another mile this year. The road will be used in 1956 for completing the spray job around the rim of the Kalispell Creek basin.

A three-day school was held in June for spray crews. All phases of chemical eradication methods and operation of equipment were covered. Virgil D. Moss assisted project personnel in conducting the school.

Chemical ribes eradication is summarized in the following table:

Program	Acres	Man Days	Ribes	Gallons
National Forest	1,360	1,790	720,000	309,220

5. Contract Ribes Eradication, 1955

Accomplishments by contracting this year were comparable to 1954 although fewer man days were expended. Individual contracts were located over an extensive area from the Muddy Creek unit on the Colville National Forest to Boulder Creek unit on the upper Priest River and Bear Creek on the east side of Priest Lake. Contracting has served to complete areas too small or isolated to work economically with force account crews.

Twenty-three contracts were awarded this year, 21 on national forest lands and two on state and private lands. The average size was 61 acres per contract with an average bid price per acre of $12.70.

The following table summarizes the results on contracts completed this year:

Program	Number of Contracts	Acres	Man Days	Ribes	Amount Paid
National Forest	21	1,210	530	14,000	$13,903
State and Private	2	190	90	1,000	1,721
Totals	23	1,400	620	15,000	$15,624

III. CONTROL STATUS

1. Checking and Surveys

Regular check was performed on all hand eradication areas this year. Areas that did not meet specified standards were immediately reworked. One regular checker, directly supervised by the camp superintendent, was assigned to each camp. To insure compliance with checking procedures and standards, a systematic spot check was performed on a minimum of 40 acres in each camp work area by the checking supervisor or checker foreman.

To give better individual instruction this year's checking school was divided into two groups. Solution of field problems was stressed. A crew of 16 men post checked a total of 38,000 acres on national forest and state and private lands. The checker flanker method was used exclusively. All flankers carried a light string ball on their belts. The string unwound as the flanker searched for ribes making it possible for an inspector to observe the amount of area covered. Post check efficiency was greatly improved this year by the addition of the string. A total of

6,000 acres was surveyed for rust damage in reproduction and pole stands. Most surveys were accomplished by permanent employees after the eradication field season was complete.

2. Summary of Ownership and Control Status

NATIONAL FOREST UNITS

The present control program on national forest lands is comprised of 42 units with protection financed entirely from federal BRC funds. Four units are being jointly financed by national forest and state and private funds. The land within these units is 50 percent federal and 50 percent state and private. These four units were originally set up as state and private units in the Bureau of Entomology program. As a result, 10,160 acres have been added to the program. One unit of 2,350 acres was also added to the national forest program. This unit contains high value pole stands formerly in the Old Gleason unit. Reanalysis of units during the past year resulted in the dropping of the deferred Gold Creek unit, Snow Creek drainage in the Tunnel Creek unit, Canyon Creek portion of the Experiment Station, and smaller reductions resulting from adjustment and realignment of unit boundaries. As a result of changes the gross area in the national forest program was reduced 6,120 acres.

A summary of accomplishments for the five-year program, 1950-1954, showed that with few exceptions control work has progressed according to schedule. This made it possible to include in the present five-year program the 11 units deferred during the 1950-1954 program.

Inspection trips were made during the past season in several tributaries of the Pend Oreille River drainage in Washington which contain thrifty stands of pole size white pine. Although no control work has been done in this area, rust damage does not appear to be severe. Disease and stocking surveys and post checks will be run in 1956 to determine if these stands warrant inclusion in the control program.

Through the use of K-V funds, rehabilitation of cutover areas to the growing of white pine has become an intricate part of the BRC program on this forest. Since 1950 over 1,000 acres have been treated on 14 areas within eight units. The various steps in this important phase of forest management are illustrated in the pictures accompanying this report.

STATE AND PRIVATE UNITS

The present control program on state and private lands is now composed of six units where control work is financed entirely from federal cooperative and state and private funds and four units with a division of financial responsibility. Division of financial responsibility on the four units, Trail Creek, Hellroaring Creek, French Creek, and Ruby Creek, had the effect of transferring 10,160 acres from the state and private program to the national forest program. By adjustment and realignment of boundaries in other units, a further reduction of 4,062 acres was made, leaving a total of 43,747 gross acres in the state and private program.

The Samuels unit, which was a low priority unit in a deferred status, was dropped from the program and a new unit created from the best white pine area in the old Samuels unit and the excellent white pine pole stands in the adjoining French Creek drainage. The new unit will be known as the French Creek unit.

All necessary work was completed in Fox Creek this year to place the unit on a maintenance basis. The 1956 eradication program will be concentrated in the excellent white pine pole stands in Ruby and Hellroaring Creek units. A small spray crew will operate in the Middle Fork of East River unit on stream type rework and initial spray of recent cutover area in the head of Tarlac Creek. Contract eradication will be continued in the Bear Creek unit.

The new five-year program was reviewed by Roger Guernsey, Idaho State Forester.

Summary of Ownership

Ownership	National Forest Units (Acres)	State & Private Units (Acres)	All Units (Acres)
Federal	204,703	6,407	211,110
State	4,490	30,420	34,910
Private	23,950	6,920	30,870
Totals	233,143	43,747	276,890

Summary of Control Status

Control Status by Age of Stand	Total Acres	Unworked	Needing Rework	Needing Post Check	On Maintenance
National Forest Units:					
1940-1959	20,906	1,125	2,200	4,369	13,212
1920-1939	56,694	5,094	8,490	18,721	24,389
1900-1919	35,735	1,825	5,142	10,873	17,895
Older Pole	62,783	7,355	4,825	20,622	29,981
Mature	57,025	14,235	4,073	25,673	13,044
Totals	233,143	29,634	24,730	80,258	98,521
State & Private Units:					
1940-1959	1,628	380	205	456	587
1920-1939	10,593	260	2,462	2,994	4,877
1900-1919	11,857	210	520	3,760	7,367
Older Pole	8,313	2,006	210	5,047	1,050
Mature	11,356	3,010	956	4,502	2,888
Totals	43,747	5,866	4,353	16,759	16,769
Grand Totals	276,890	35,500	29,083	97,017	115,290



First Step in Rehabilitation - Pelke Unit, 1952
All sawtimber, poles and posts harvested. Remaining unmerchantable standing trees felled. Fire line dozed. Area ready to burn. All work accomplished with K-V funds.



Second Step - Control Burn - 1953.



Third Step - Area Ready for Blister Rust Eradication and Planting in 1956.



Fourth Step - Planting - Kalispell Bay, 1944
Rehabilitated area now fully stocked with white pine. All rehabilitation steps, including planting, accomplished with K-V funds.



Fully Stocked Natural Stand of Young Pole - Goose Creek - Pelke Unit.



Natural Stand 60-Year Old Pole - Bear Paw Unit.

6 - BLISTER RUST CONTROL, COEUR D'ALENE NATIONAL FOREST, 1955

F. J. Heinrich, Project Officer

I. INTRODUCTION

Blister rust control activities were performed in accordance with the 1955-1959 work plan. The over-all current objectives were met with the exception of contract ribes eradication where accomplishments were 50 percent short of estimates.

Within the present control area, there are 280,600 acres of white pine producing lands. Out of this total, 28 working units comprising 143,300 acres are in the present control program. Ten of these units, totaling 55,000 acres, were added in 1955. This was made possible by the completion of scheduled work on some areas and the availability of K-V funds for control work on specific cutover lands. Additional units will be added as funds become available.

II. 1955 FIELD PROGRAM

1. Expenditures, Calendar Year 1955

Source of Funds	National Forest Program Idaho
Federal	
Leadership	$ 8,485
Control	148,342
K-V	3,639
Total	$160,466

2. Organization, 1955

The over-all field workload was divided between two qualified unit supervisors. One man directed the activities of the five regular 20-man camps and spray crews. The other unit supervisor was responsible for the contract ribes eradication program along with checking and survey activities.

Work camps were reduced in size to 20 men, which resulted in greater operating efficiency. Effective man-day costs were reduced 10 percent compared to 1954 even though wages increased. Camp personnel were divided into two field crews, one handled by the camp superintendent and the other

by a strawboss. The power spray crews, which were in addition to the five camps, were set up separately for actual field work. The spray crews worked within close proximity of each other. A strawboss was in direct charge of each spray crew with one designated in over-all charge.

The safety program objectives were met for the second consecutive year. There were no vehicle or lost time accidents.

Program	Camps	Employees	Contractors
National Forest	5	135	8

3. Progress on All Ribes Eradication, 1955

Accomplishments by the regular crew were in line with preseason objectives. However, some changes in plans were necessary. The Potter Creek area which was sprayed in 1954 had to be worked by hand ribes eradication methods in preparation for 1955-1956 planting. The treatment of two areas, Riley and Snyder Creek, by chemical ribes eradication methods were intentionally delayed until the 1956 field season.

Camps were located at Hudlow, Trail, Riley, West Elk, and Owl Creek camp sites. All work area has been completed from the Camp Owl Creek site and the camp facilities are being moved to the Steamboat area. The remaining camps will retain their same location for 1956.

A special training school was held for the supervisory personnel prior to the arrival of the crews. Crewmen were adequately trained in all phases of blister rust control work. They were also trained in forest fire suppression; however, very little time was spent on fire assignments by crewmen.

Program	Working	Regular Work Acres	Checker Flanker Acres	Total Acres	Man Days	Ribes	Per Acre Man Days	Per Acre Ribes
National Forest	Initial	350	90	440	890	214,000	2.00	486
	Rework	3,240	330	3,570	4,140	99,000	1.16	28
	Totals	3,590	420	4,010	5,030	313,000	1.25	78

Note: Number of acres in National Forest Program worked with K-V funds: 270.

4. Chemical Ribes Eradication, 1955

Chemical ribes eradication methods were used for ribes suppression on 360 acres. Two truck-mounted power sprayers were used on the Echo Peak job. Chemical solution of 2,4,5-T was mixed in a 500-gallon tank at the source of the water supply and transported to the tankers. One portable power sprayer was used on major stream type in Drexall Creek drainage. Knapsack sprayers were used on minor stream type and other small selected areas.

All 1954 sprayed areas were carefully inspected and results analyzed. Reason for unsatisfactory kill apparently was insufficient amount of chemical solution applied to the ribes foliage and crown. During 1955, an effort was made to correct this deficiency. Several test spray areas were established during the summer and late fall. Considerable emphasis was also given to the use of scarifying prongs about two inches long attached to the end of the spray gun. In actual use the prongs disturbed the duff mantle around the crown allowing the chemical solution to reach the crown and roots more efficiently. During the spraying process the ribes stems were scarred providing a suitable marker by which supervisory personnel could see if crowns were actually treated by the crewmen. Results of these crew field tests will be determined during the summer of 1956.

The late fall spray job on Snyder Creek which was completed in early November 1954 compared favorably in effectiveness with areas treated during the summer months.

Program	Acres	Man Days	Ribes	Gallons
National Forest	360	650	219,700	67,470

5. Contract Ribes Eradication, 1955

The contract ribes eradication program got off to a very low start. Only four men were working prior to August 1. During the first week in August, four more men were successful in obtaining contracts. Sixteen contracts, four in Brett Creek unit and 12 in Snowbird unit, were awarded and completed. Award prices ranged from $17.50 to $24.46 per acre for an average of $17.69. The policy of listing the maximum acceptable bid on bid invitations has had a tendency to shove all bids up near the maximum. Although cost per acre increased on contract work, it still was a substantial saving over that done by regular forest crews. The outlook for a successful contract program in 1956 is favorable.

Program	Number of Contracts	Acres	Man Days	Ribes	Amount Paid
National Forest	16	580	480	6,800	$10,258

III. CONTROL STATUS

1. Checking and Surveys

A training program to develop new checkers and to give refresher instructions to experienced checkers was held again this year. Checking personnel were required to meet specific performance standards before they were given actual field assignments. One checker was assigned to each camp. His duties were to check crew work as completed, assist camp superintendents in establishing work area boundaries, and train men to lay string lanes properly. When time permitted, the checker did post check work.

All lots completed by the regular camp crew were given the standard lot check. Lots from which four or more ribes were removed received a double check if no ribes were found on the first check. Out of 250 lots in this category, ribes were found on 10 percent as a result of the second check. The results of a checking study which was performed in each camp will appear in a separate report.

Analysis of the 5,000 acres of young pine stands post checked showed 1,000 acres as being on maintenance and 4,000 acres needing additional work.

A systematic pine disease survey was run on 27,000 acres involving 13 units. Two of these units, Lower Middle Fork of Big Creek and the West Fork of Big Creek, were on the St. Regis Ranger District. Throughout this survey strip locations were generally the same as those which had previously been run. The data obtained from this survey has not been analyzed. The results will appear in a separate report.

At the Savenac Nursery no infection was found on 1,000 WWP 2-2 stock examined. Out of 500 8-year-old WWP examined, six had been infected during the years 1949-1951.

2. Summary of Ownership and Control Status

Land ownership within units selected for blister rust control work is predominantly federal. Only five percent is state or private owned.

During the past several years, concentrated control efforts have been directed toward the protection of established stands. Ribes were often numerous and reseeding occurred before they were removed. Disturbances on these areas often result in the regeneration of ribes and high protection costs.

In recent years close integration of blister rust control with other forest activities has been practiced. On areas supporting mature stands, plans for a new timber crop and control work are made prior to harvesting. In many cases, K-V collections are made to finance blister rust control costs. Through proper coordination of forest activities, control costs on these areas are being held to a minimum.

As a result of the 1955 control program, 2,000 acres were classed as maintenance. Over 22 percent of the 143,300 acres in the present control program is now on maintenance.

Summary of Ownership

Ownership	National Forest Units (Acres)
Federal	265,500
State	4,400
Private	10,700
Total	280,600

Summary of Control Status

Control Status by Age of Stand	Total Acres	Unworked	Needing Rework	Needing Post Check	On Maintenance
National Forest Units:					
1940-1959	6,900	1,500	1,400	3,400	600
1920-1939	61,000	18,100	6,800	21,500	14,600
1900-1919	41,100	5,300	8,300	17,600	9,900
Older Pole	17,300	2,000	800	8,300	6,200
Mature	154,300	60,200	34,800	45,900	13,400
Totals	280,600	87,100	52,100	96,700	44,700

7 - BLISTER RUST CONTROL, KOOTENAI NATIONAL FOREST, 1955

J. P. Bushfield, Project Officer

I. INTRODUCTION

The blister rust control program on the Kootenai National Forest in 1955 consisted of 102,500 acres of federal and 1,600 acres of privately owned land. This acreage is divided into 73,500 acres in present program units and 30,600 acres in deferred program units. The present program is composed of 10 units that contain predominantly pole stands. The goal of the second five-year program is to place all of these units on maintenance.

II. 1955 FIELD PROGRAM

The 1955 program was composed of two 12-man camps and one 18-man camp. Two of the three were pack camps. The pack camps were located in the North and South Forks of Callahan Creek. The road camp started the season in the Star Creek unit and progressed to the Burnt Creek and Red Top Creek units. Combined camps finished the season in the Spread Creek unit.

The 1955 eradication program was very successful with all of the planned work completed by the end of the field season. Rework in the North Fork Callahan unit was performed on the east side of Willard-Caribou Creek and on the south side of Callahan below the mouth of Caribou Creek. All stream type within the unit was also reworked. This places the unit on maintenance except for the stream type.

The South Fork of Callahan unit had rework performed in the upper end of the drainage in Lost Fork, Glad Creek, and the South Fork proper. Some areas within this unit are still not stabilized and further work will be necessary in these areas. Work in the Star Creek unit was performed on all planted areas. No seedlings were encountered which indicates that the area is stabilizing. None of the area worked was placed on maintenance even though it met the maintenance standards because of its age and type.

Work in the Burnt and Red Top units, by the Star Creek camp, completed the 1954 work program planned for those units. Of the area in Red Top and Burnt Creeks worked this season, 85 percent was placed on maintenance.

In the Spread Creek unit, work was performed in the lower end on the south side of the creek. The area for the most part has light ribes conditions and indicates that our program for the Spread Creek unit should progress at a rapid pace.

Eighty percent of the seasonal employees were college students this season and were of higher caliber than last season's men. The program also had a sufficient number of experienced overhead available, which helped considerably in administration this season.

1. Expenditures, Calendar Year 1955

Source of Funds	National Forest Program Montana
Federal	
Leadership	$ 4,875
Control	48,060
K-V	420
Total	$53,355

2. Organization, 1955

Program	Camps	Employees	Contractors
National Forest	3	42	None

3. Progress on All Ribes Eradication, 1955

Program	Working	Regular Work Acres	Checker Flanker Acres	Total Acres	Man Days	Ribes	Per Acre Man Days	Per Acre Ribes
National Forest	Initial	160	120	280	50	3,200	.18	11
	Rework	1,870	480	2,350	1,210	41,000	.51	17
	Maintenance	40	40	80	40	800	.50	10
	Totals	2,070	640	2,710	1,300	45,000	.48	17

Note: Number of acres in National Forest Program worked with K-V funds: 70.

4. Chemical Ribes Eradication, 1955

Program	Acres	Man Days	Ribes	Gallons
National Forest	20	19	5,300	250 Backpack

Chemical eradication was reduced considerably from last season as the proposed spray area in the South Fork of Callahan unit did not fulfill power spraying requirements.

III. CONTROL STATUS

1. Checking and Surveys

The checking force for each camp consisted of one checker and a flanker. The flanker was used as a stringer when he was not running post check with the checker. This method seemed to work out very well this season and a maximum acreage was covered with a minimum of cost. Advance survey was run by combined checking crews at the end of the season in the North Fork of Meadow Creek unit.

During inclement weather the first part of the season, Star Creek camp performed some canker pruning in selected areas of the Star Creek plantation.

It was planned to run a disease survey when eradication was completed in the fall, but the survey men were temporarily lost to fire, making it necessary to postpone the survey work until next season.

2. Summary of Ownership and Control Status

Summary of Ownership

Ownership	National Forest Units (Acres)
Federal	102,500
State	-
Private	1,600
Total	104,100

Summary of Control Status

Control Status by Age of Stand	Total Acres	Unworked	Needing Rework	Needing Post Check	On Maintenance
National Forest Units:					
1940-1959	1,580	200	-	1,180	200
1920-1939	-	-	-	-	-
1900-1919	5,030	250	790	1,270	2,720
Older Pole	48,290	22,020	1,700	4,460	20,110
Mature	49,200	31,530	2,910	3,190	11,570
Totals	104,100	54,000	5,400	10,100	34,600

8 - BLISTER RUST CONTROL, NATIONAL PARKS, 1955

(Glacier, Yellowstone, Rocky Mountain)

J. C. Gynn, Forester, and C. M. Chapman, Forester

I. INTRODUCTION

The white pine blister rust control program on Glacier, Yellowstone, and Rocky Mountain National Parks was conducted according to plan.

Two Government Agencies Cooperate

The U. S. Forest Service furnished leadership, coordination and technical direction for the work. Park Service foresters were responsible for operational activities. The cooperative effort of the two agencies functioned efficiently with no duplication of work. Park Service officers participating were as follows:

Glacier	: Elmer Fladmark, chief ranger
	*A. D. Cannavina, assistant chief ranger
	Paul Webb, district ranger
Yellowstone	: Otto Brown, chief ranger
	*H. O. Edwards, assistant chief ranger
Rocky Mountain:	Ruben Hart, acting chief ranger
	H. Ebert, district ranger
	*Merle Stitt, assistant district ranger
	Maynard Barrows, National Park Service consulting forester

*In charge

Forest Service representatives: John C. Gynn and C. M. Chapman

Improved Equipment Increases Efficiency

The new portable power spraying units purchased by all parks resulted in greater efficiency although many interruptions occurred until proper impellers were secured. New transportation trucks fitted with seats and canopy tops lowered travel time and increased safety. For the first time, air mattresses were furnished blister rust control pack camps, replacing the old cotton pads. This trial resulted in a great reduction in packing bulk and weight. More comfort and a better night's rest for the men lifted morale. Not a single mattress was damaged from packing or use.

Safety Program Intensified

Glacier National Park foresters collaborated with Forest Service personnel to prepare a pocket-size Safety Manual. It is a short compilation of dangerous situations and precautions important in blister rust work. Copies were issued to all BRC men in the three parks for personal study. They were also used as a guide for weekly safety meetings. Additional safety helmets were purchased and their use made mandatory for all blister rust crews in the woods.

Additional Areas Appraised for Control

The director of the National Park Service requested the Division of Blister Rust Control to assist the Parks re-evaluate certain white pine areas. Representatives of the two agencies made many inspections of white pine stands and determined a pine count-advance check survey should be made on 27,270 acres. From these survey data evaluations will be made as to the economic feasibility of blister rust control.

Areas surveyed were as follows: Glacier - present Park Headquarters unit to Lake McDonald, and extensions adjacent to the East Glacier (Rising Sun) and Two Medicine Lake units.

Yellowstone - Antelope Creek, an extension to the Mt. Washburn area; Canyon and vicinity adjacent to Mt. Washburn control unit; Fishing Bridge Campground and surrounding protection zones; Clear Creek west of Sylvan Lake to Teton Point; and large extensions to the Craig Pass unit.

Grand Teton - a vista point and vicinity adjacent to the new highway overlooking Deadman's Bar on the Snake River. All other areas inspected appeared impractical for control and were not surveyed.

Rocky Mountain - inspections were made and surveys started, which will be completed in 1956 in the Hidden Valley and Twin Sisters Lookout areas.

The results of the survey and recommendations will be made in a separate report for National Park Service consideration.

The following areas were inspected and eliminated without surveying because of insufficient white pine or because topography and pathological situations made control doubtful and not economically feasible: Grand Teton - Coulter Bay, South Cascade Canyon, Death Canyon-Static Peak, east slope of Tetons (Cascade Creek to Death Canyon), and lower portions of Pilgrim Creek; Yellowstone - Bridge Bay and east shore of Yellowstone Lake to Teton Point.

Disease Increasing and Spreading Southward

Inspections showed that blister rust is intensifying in the unprotected areas immediately adjacent to the Mammoth control unit in Yellowstone and adjacent to all control units in Glacier.

Scouting for the spread of the rust showed it is now spreading southward down the Teton Mountain Range. For the first time, blister rust cankers were found on white pine (Pinus flexilis) in the Darby Creek drainage, 90 miles south of the nearest previously known white pine infection. The recent find is 11 miles west of Grand Teton National Park Headquarters just three miles outside of the Park boundary.

II. 1955 FIELD PROGRAM

Initial ribes eradication and maintenance control were performed in Yellowstone and Rocky Mountain National Parks and rework and maintenance control were continued in Glacier.

New Area Included at Rocky Mountain

The National Park Service approved a 2,500 acre addition in the Boulder Brook drainage at Rocky Mountain. This extends the boundaries of the Longs Peak-Estes Cone control unit west to high, barren natural topographic barriers. The Boulder Brook basin contains excellent white pine (P. flexilis) reproduction with patches of mature at higher elevations constituting a continual seed source. It is transected by the Longs Peak-Bear Lake trail and much of the area is in the panorama seen from the Bear Lake recreational center. Adjustments were made in the 1954-1959 estimates for Rocky Mountain in order to start ribes eradication on this unit in 1955.

1. Expenditures, Calendar Year 1955

National Park	National Park BRC	Forest Service Leadership and Technical Direction	Total
Glacier	$13,144	$2,810	$15,954
Yellowstone	48,318	5,151	53,469
Rocky Mountain	9,266	1,405	10,671
Grand Teton	115	-	115
Totals	$70,843*	$9,366	$80,209

*Includes $3,279 for surveying areas.

2. Organization, 1955

Only one experienced camp superintendent was available in 1955. Promising experienced leadmen were intensively trained to fill the other four superintendent positions. Batching pack camps were used at Glacier and Rocky Mountain. Yellowstone used a large government subsisted pack camp in the Carnelian Creek Extension. Other crews were stationed at regular utility work centers. The following table shows the 1955 field force:

National Park	Camps	Employees
Glacier	2	12
Yellowstone	2	35
Rocky Mountain	1	7
Totals	5	54

3. Progress on All Ribes Eradication, 1955

At Yellowstone, man days lost because of a late start, inclement weather, and forest fire suppression retarded maintenance control and delayed the completion of initial ribes eradication on the Mt. Washburn Extension until 1956. The good progress of the work in Glacier and Rocky Mountain more than offsets the reverses occurring at Yellowstone. The 1955 accomplishments by parks were as follows:

Program	Working	Regular Work Acres	Checker Flanker Acres	Total Acres	Man Days	Ribes	Per Acre Man Days	Per Acre Ribes
Glacier	Initial	-	-	-	-	-	-	-
	Rework	350	-	350	420	8,900	1.20	25
	Maintenance	220	-	220	60	1,100	.27	5
	Totals	570	-	570	480	10,000	.84	18
Yellowstone	Initial	810	-	810	1,220	626,000	1.51	773
	Rework	380	-	380	230	8,500	.61	22
	Maintenance	250	-	250	40	500	.16	2
	Totals	1,440	-	1,440	1,490	635,000	1.03	441
Rocky Mountain	Initial	620	330	950	300	8,300	.32	9
	Rework	110	-	110	60	700	.55	6
	Maintenance	-	-	-	-	-	-	-
	Totals	730	330	1,060	360	9,000	.34	8
All Programs	Initial	1,430	330	1,760	1,520	634,300	.86	360
	Rework	840	-	840	710	18,100	.85	22
	Maintenance	470	-	470	100	1,600	.21	3
	Totals	2,740	330	3,070	2,330	654,000	.76	213

4. Chemical Ribes Eradication, 1955

Portable power spraying chemical methods were used extensively for initial work. Hi-Fog guns were used at higher elevations where water was in short supply. Early season work was planned to take advantage of water from melting snowdrifts usually dissipated by midseason. Portable power spraying equipment was transferred from Glacier to Yellowstone replacing a unit completely destroyed by a flash flood in a tributary of Carnelian Creek. Power spraying methods were used for the first time at Rocky Mountain in the new Boulder Brook unit.

National Park	Acres	Man Days	Ribes	Gallons
Yellowstone	390	920	546,000	34,700
Rocky Mountain	110	90	6,200	2,840
Totals	500	1,010	552,200	37,540

III. CONTROL STATUS

1. Checking and Surveys

Five selected leadmen from the blister rust crews were thoroughly trained in all types of checking and disease survey methods. The checkers did a splendid job and completed all work assignments. Results were as follows: Current work areas were immediately checked for efficiency so mopup could be performed accordingly; post check was done on 6,730 acres to determine stability and status of control; and 27,270 acres of additional white pine area were surveyed. Disease surveys were performed on 2,870 acres in the proposed extensions at Glacier.

2. Summary of Control Status

Post check, using the flanker method, was performed on 5,430 acres in the maintenance category to determine their stability as to ribes seed germination and permanence of ribes suppression. The results showed (1) most of the areas are well stabilized and meet maintenance standards; (2) seedlings are occasionally occurring in a few small portions probably from ground disturbances caused by game concentrations, blowdowns, and rock slides; (3) wherever Ribes setosum, a rapid grower and prolific early seed producer, originally occurred in stream type conditions, maintenance control must be carefully scheduled to prevent another seed crop; (4) maintenance control work schedules are adequate and must be adhered to until all ribes seed germination stops in order to prevent another cycle of seedling suppression.

Summary of Control Status

National Park	Total Acres	Unworked	Needing Rework	Needing Post Check	On Maintenance
Glacier	5,140	-	1,080	630	3,430
Yellowstone	13,100	470	3,270	1,610	7,750
Rocky Mountain	8,600	1,550	350	750	5,950
Totals	26,840	2,020	4,700	2,990	17,130

IV. RECOMMENDATIONS

The following field programs are recommended for 1956:

Glacier National Park

24 man months. Average total seasonal employees - 8.

East Glacier and Oldman Lake - 6 men, ribes eradication
1 superintendent
1 checker

Starting date - June 11, 1956

Yellowstone National Park

99 man months. Average total seasonal employees - 33.

Mt. Washburn - 5 men, ribes eradication
1 foreman
1 checker

Mt. Washburn Extension - 24 men, ribes eradication
1 superintendent (serve both camps)
1 checker

Starting date - June 4, 1956

Maintenance control to be performed at Mammoth during training period.

Rocky Mountain National Park

48 man months. Average total seasonal employees - 16.

Longs Peak-Estes Cone - 5 men, ribes eradication
1 foreman

Boulder Brook - 8 men, ribes eradication
1 superintendent (serve both camps)
1 checker (serve both camps)

Starting date - June 11, 1956

The above recommendations are made on a six-day work week basis for all parks.

Each park should hire several additional men at the start to compensate for man-day losses caused from late arrivals, quits, fire suppression activities, and employees leaving early for school. Extra hiring should be as follows: Glacier, 3; Yellowstone, 6; Rocky Mountain, 3. Every effort should be made to maintain the average total seasonal employee level as designated.

The above recommendations for 1956 apply only to the present control area of 26,840 acres.

9 - DEVELOPMENT AND IMPROVEMENT OF BLISTER RUST CONTROL METHODS, 1955

V. D. Moss, Forester

Methods development and improvement activities during May and June consisted in assisting the control operations with training programs for chemical spray crews, checking results of their 1954 sprayings, preparing final spray methods specifications for 1955, and planting to western white pine seedlings for survival and growth studies the 1954 chemical sprayed sod control plots in the Kaniksu National Forest.

Beginning in July and continuing through October, activities consisted in testing new chemical forms of 2,4,5-T and other growth hormone-type herbicides on ribes, testing marking materials as spray tracers, checking results of 1954 spray tests, developing oil/water emulsion sprays for late season chemical treatment of ribes, and continuing ribes ecology studies to coordinate blister rust control methods and timber management practices. Results and progress of chemical methods and ribes ecology studies during 1955 are reported.

Phenoxypropionic Acid Tests in 1954

Experimental quantities of 2,4,5-TP (2(2,4,5-trichlorophenoxy) propionic acid) for initial tests on ribes were compared with a butoxyethanol ester of 2,4,5-trichlorophenoxy acetic acid in foliage-type and soil-drenching type treatments. Plots were one-tenth acre in size and consisted of five-year old and younger Ribes viscosissimum and lacustre. Treatments were replicated through August 12. Foliage-type treatment consisted in applying spray adequately to wet leaves, tips of all growing branches, and stems to ground level. Soil-drenching type treatments involved wetting all foliage to the point of dripping and thoroughly drenching soil about root crowns of ribes. Results are shown below.

Chemical Form of 2,4,5-T	Commercial Formulation of 2,4,5-T	Average % Seedlings Killed at 2000 ppm AE Type Treatment	
		Foliage	Soil Drench
Isooctyl ester of propionic acid	Pittsburgh Coke & Chem. Co. "Propon 4"	88	100
Propylene glycol butyl ether ester of propionic acid	Dow Chemical Company "Kuron 4"	85	100
Amine salt of propionic acid	Dow Chemical Company "Silvex (M-213)"	51	83
Butoxyethanol ester (acetic acid)	American Chemical Paint Co. "Weedone LV-4"	86	100

Ribes Killed Affected by Spraying Methods

To improve the effectiveness of spraying methods studies were made of 1954 forest-sprayed areas to determine why ribes survived chemical treatment. Conclusions are as follow:

1. Failure to drench soil thoroughly about root crowns of ribes accounted for the majority of live bushes. Reasons were (a) no soil drenching, (b) drenching but missing location of root crown, (c) top drenching soil without moving aside bark and litter, (d) applying too low a volume of spray to wet soil adequately about root crowns, and (e) not drenching soil far enough about root crown to wet roots which absorb chemical.

   Growth habit of ribes was found to have an important effect on spraying results. Ribes growing on a slope should be heavily drenched on the uphill side and the two horizontal sides of the root crown. Ribes growing next to or from under down timber should be sprayed from both sides of the log and the ground drenched beneath both sides of the log opposite the root crown. Roots of ribes follow moisture beneath the logs and often soil drenching is not extended far enough about root crowns to reach the zone of heavy root development. The more branched root system of R. lacustre requires soil drenching at greater distances from the root crown than R. viscosissimum.

2. Failure to spray large ribes from all sides of the bush results in part of the plant's being missed and surviving chemical treatment. Reason is because lethal amounts of chemical are not translocated by the bush.

3. Failure to spray an area systematically accounted for a surprising number of live bushes. Unsprayed strips are found occasionally also. Training, supervision, strip numbering, and use of a spray marker help to prevent missing bushes.

Oil/Water Emulsions of 2,4,5-T

After the seasonal period of active plant growth, 2,4,5-T aqueous spray should have an amendment to facilitate the penetration of chemical into the mature hardening leaves and stem bark of plants and to increase the stability of spray applied as a soil drench. One of the best and the cheapest is stove oil or Diesel oil. In 1955, tests were made to evaluate oil/water emulsions and to improve methods for making and applying them during the fall months.

The best oil/water emulsion spray for ribes is one in which oil is suspended uniformly in water in mist-like droplet size. At present, the method for emulsifying oil in water differs with portable and truck-mounted power sprayers. For truck-mounted power sprayers, oil and 2,4,5-T are poured together and the mixture injected under pressure into the sprayer tank as it is filled with water. For portable power sprayers without injectors, an oil/water emulsion spray is prepared as follows:

1. Fill container in which spray is to be mixed with water.

2. In a five-gallon pail mix together the 2,4,5-T and oil.

3. With pressure on, vigorously stir with nozzle opened to a cone spray the 2,4,5-T and oil mixture in pail until two to three gallons of water are added.

4. Pour the two to three gallons of spray concentrate in pail through a funnel into container previously filled with water.

5. Place nozzle into container opening for extra agitation and to allow hose line to become filled with new spray mixture before starting to spray.

Late Season Spraying Techniques

Growth maturity and gradual defoliation of ribes leaves after mid-August require somewhat different spraying methods than are used when plants are fully foliated and actively growing. In the fall more spray should be applied to wet more soil about the root crowns. If the plants are dormant, it is not likely much chemical will be absorbed by the roots until new growth commences in the spring. A good way to place a heavy chemical charge about root crowns is to punch a hole three or four inches into the soil on the uphill side and fill with spray, then apply a regular drench for a distance of six to eight inches about each root crown. Soil drenching distances about root crown should be adjusted according to size and growth habit of the ribes bush. Various type prongs mounted on Pecan Gun nozzles have been tried for prodding and drenching soil about root crowns. These may prove to be very helpful. To secure distribution of chemical in aerial portions of bush, apply enough spray to all sides of the bush to wet all stems and winter buds thoroughly.

Development of Markers for 2,4,5-T Sprays

Oil and water soluble dyes, dispersible paint pigments, various organic and inorganic powders, and low volatile fraction oils were evaluated as markers for 2,4,5-T aqueous sprays. The oil and water soluble dyes included National OIL RED O and OIL ORANGE 2311; American Cyanamid water soluble CALCOZINE ORANGE RS, RHODAMINE BXP, and VIOLET EX. CONC., and oil soluble CALCO ORANGE 7078-V, SCARLET BL, and METHYL VIOLET BASE. Dispersible paint pigments included Interchemical ARIDYE SXN RED B 5300-47, and FLUSHED YELLOW G-4875, and Sun Chemical BENZIDINE YELLOW 2201-H. Powders consisted of Carbola Chemical mineral talc ASBESTOL REGULAR; Specialty Woods Products WOOD FLOUR; and commercial grades of ALUMINUM BRONZING POWDER, GRAPHITE, CALCIMINE, SULFUR, AND POWDERED MILK. Oils included DIESEL, STOVE, and Socony Vacuum SOVASPRAY 100.

Least satisfactory as markers were the water and oil soluble dyes. They were objectionable also for effects on the workers.

Three inert powders, ALUMINUM BRONZING POWDER, WOOD FLOUR, AND ASBESTOL REGULAR, were selected from the preliminary tests for further practical tests in truck-mounted power sprayers. A large enough quantity of ASBESTOL REGULAR, a mineral talc, was not obtained in time this season for tests with truck-mounted power sprayers.

Aluminum bronzing power was added to spray at weight rates of 2, 4, 6, 8, and 10 pounds per 100 gallons of 2,4,5-T solution. Like Titanox B-30 (titanium oxide), aluminum bronzing powder adheres to metal causing walls of the sprayer tank to become heavily coated with aluminum. Also, weight of the metallic powder is against keeping it in suspension as large amounts collect beneath the agitator paddles. Besides being costly (92 cents per pound) aluminum bronzing powder is not easily dispersed in water. Masses of it would float on top of the 2,4,5-T spray which was under turbulence by a mechanical agitator and pump by-pass.

Wood flour, ground from western white pine shavings, has come closest to being the most satisfactory marking material. It does not adhere to metal. Being of light weight, it is easy to keep in suspension by agitation. It disperses easily when added to spray. It is cheap, costing three cents per pound from the manufacturer, and it is the least likely of the materials to cause injury. Two grades of wood flour were tested. "100-mesh" and "300-mesh" or "Superfine" grade. Because of its greater density per given weight, the superfine grade of wood flour excelled in marking foliage of ribes. The amount of wood flour deposited on foliage of ribes varies with spraying pressures. High pressures tend to blow the spray and flour off the leaves; lower pressures allow greater amounts of residue to remain as a marker. The puberulent and glandular surfaced leaves of R. viscosissimum are more receptive to holding a marker than the slick surfaced leaves of R. lacustre.

Superfine wood flour is used at the rate of four pounds or more per 100 gallons of 2,4,5-T spray. When first filling a truck-mounted power sprayer, five pounds of wood flour is added per 100 gallons of spray. Thereafter, four pounds per 100 gallons of spray usually is adequate during the season ribes are actively growing.

The following oils were tested as markers: DIESEL, STOVE, and SOVASPRAY 100. Oils are fairly effective as a temporary marker for aqueous spray. Properly emulsified in spray, oil will put a glossy coat visible for 10 to 15 minutes on leaves of ribes. Their use as markers should be restricted to late season spraying. Otherwise, they may cause too rapid a leaf kill for absorption of chemical. Major function of oils in aqueous sprays is to facilitate penetration of chemical when plant is not actively growing. For this purpose stove oil and Diesel oil are satisfactory.

Dalapon

The Dalapon 1954 sod plots in the Kaniksu National Forest were planted to western white pine and examined for effectiveness of grass control. One hundred seedlings (2-2 stock) were planted by 6'6" spacing in one-tenth-acre plots. Raymond J. Boyd and Marvin W. Foiles of the Inland Empire Research Center helped in the planting. The Experiment Station will study the survival and growth of the planted pine in relation to the development of herbage cover. The effectiveness of Dalapon in controlling sod was determined from the number of wire loop (three-quarter-inch diameter) transects occupied by grasses and forbs in relation to the number of total links (200) in two 1-chain-long permanent sample strips across each one-tenth acre plot. This procedure was followed by making the original survey of herbage cover before treatment.

The sensitivity of grasses and forbs to Dalapon is highest during the period the plants are most actively growing. It is not effective in controlling grasses much beyond the early boot stage when seed stalks begin to elongate. Its residual toxicity in the soil is of short duration as dandelion seedlings began to germinate within a month after applying Dalapon.

Satisfactory sod control for planting was accomplished by applying 12 pounds Dalapon (a.e.) per acre in mid-June during the period of active plant growth. On this plot the scattered patches of parent grasses remaining were not troublesome in operating the planting tool nor in tamping soil about roots of seedlings. Roots of grasses were fairly well decomposed making the soil surprisingly loose for planting. Cost of Dalapon (85 percent sodium salt) in 50-pound fiber drums at Spokane is $0.7975 per pound. In five-pound cans, four per case, cost is $0.8875 per pound.

Dalapon is a tan-white, free-flowing powder. It is readily soluble in water. It contains an anionic agent which has good foliage wetting properties. Since Dalapon is actively absorbed and translocated by grass foliage, the wetting ability of spray is highly important. If a wetting agent must be added, Dow Chemical Company recommends commercial household "Tide" or "Surf" at 0.1 percent based on weight of spray solution. Best results with Dalapon are obtained in applying spray that adequately wets foliage. Because it is also absorbed by the roots, application of spray to the foliage should be heavy enough for liberal runoff into the soil.

On forbs and woody plants, 2,4-D or 2,4,5-T should be added to the Dalapon spray. This combination was found satisfactory for controlling vegetation growing next to warehouse building, Kalispell Bay, Kaniksu National Forest.

Chemicals Tested in 1955

Beginning July 19 and continuing to September 21, one-tenth-acre plots were sprayed to compare the effectiveness of chemical forms of 2,4,5-T and other herbicides on ribes. Aqueous spray was applied through August 25. Thereafter to compensate for maturity and defoliation of bushes, oil/water emulsion spray was applied. The various herbicides are listed below.

American Chemical Paint Company's

Weedone L-329-T (high emulsifier)
Weedone 2,4,5-TP (propionic acid)
Weedone Brush killer (2,4-D and 2,4,5-T)
Weedone L-702 (2-methyl-4-chlorophenoxy propionic acid)

Thompson Chemicals Corporation's

Bramblcide (isooctyl ester 2,4,5-T acetic acid)

These chemicals are being tested for pre-emergence control of ribes and other problem-type forest plants:

American Chemical Paint Company's

Weedone L-841 (75 percent wettable 2,4-D amide)

Dow Chemical Company's

Baron (2-(2,4,5-trichlorophenoxy) ethyl 2,2-dichloropropionate)

COMPARISONS IN THE CONTROL OF SOD-FORMING PLANTS TO FACILITATE PLANTING OF CUTOVER LANDS BY APPLYING DALAPON AT RATES OF 4, 8, 12, 16, AND 20 POUNDS ACID EQUIVALENT PER ACRE IN AQUEOUS SPRAY

Acid Equivalent Per Acre Lbs.	Herbage Cover Before Treatment						Herbage Cover 1 Yr. After Treatment					
	Grasses		Forbs		Both		Grasses		Forbs		Both	
	Tally No.	Frequency %	Tally No.	Frequency %	Tally No.	Frequency %	Tally No.	Frequency %	Tally No.	Frequency %	Tally No.	Frequency %
DALAPON applied June 14 and 15, 1954												
4	164	82.0	22	11.0	186	93.0	78	39.0	106	53.0	184	92.0
8	156	78.5	29	14.5	185	92.5	89	44.5	66	33.0	155	77.5
12	147	73.5	41	20.5	189	94.5	69	34.5	70	35.0	139	69.5
16	127	63.5	64	32.0	191	95.5	44	22.0	81	40.5	125	62.5
20	161	80.5	28	14.0	189	94.5	29	14.5	60	30.0	89	44.5
Check	153	76.5	35	17.5	188	94.0	153	76.5	32	16.0	185	92.5
DALAPON applied July 20 and 21, 1954												
4	148	74.0	27	13.5	175	87.5	116	58.0	68	34.0	184	92.0
8	136	68.0	35	17.5	171	85.5	109	54.5	64	32.0	173	86.5
12	129	64.5	54	27.0	183	91.5	106	53.0	65	32.5	171	85.5
16	144	72.0	38	19.5	182	92.0	117	58.5	57	28.5	174	87.0
20	169	84.5	22	11.0	191	95.5	98	49.0	62	31.0	160	80.0
Check	138	69.0	51	25.5	189	94.5	139	69.5	53	26.5	192	96.0

Tally and frequency of grasses and forbs were determined by wire-loop (three-quarter-inch diameter) counts at each link and relate to the number and percentage of link loops occupied in relation to the number of total links (200) in two 1-chain permanent sample strips in each one-tenth-acre plot.

Ribes Seed Germination and Longevity Studies Following Dozer Piling of Logging Slash

This was the first year for ribes seed germination on the Armstrong Gulch area in the Clearwater where slash was piled by dozer and burned in 1954. Plots, one-tenth acre in size, are being employed to study (1) number of seedlings germinating by year following the disturbance, (2) amount and viability of seed buried at various soil depths by the dozer, and (3) effectiveness of chemical treatment by spraying the second, third, and fourth years after dozer piling. A series of one-tenth-acre plots have been established on different exposures throughout the area. Starting in 1956, a one-tenth-acre plot at each station will be sprayed with 2,4,5-T and ribes from a companion plot will be pulled. One plot each of chemical and hand pulling will be replicated at each station in 1957 and 1958.

To study the amount and viability of ribes seeds buried at various depths by dozer operation, soils were collected at each station in 1955. This was done by measuring a square foot of ground surface and collecting soils from the 0- to 2-inch depth, 0- to 4-inch depth, and 0- to 6-inch depth. The irregularity of ground surface caused by the dozer made it impossible to scalp soil cleanly exactly by two-inch layers. Consequently, each of the lower layers is measured from the ground surface and includes any soil not cleanly scalped in the removal of a top layer. Soil in the 0- to 4-inch layer includes any soil not cleanly scalped in the removal of the 0- to 2-inch layer, and soil in the 0- to 6-inch layer includes any soil not cleanly scalped in collecting the 0- to 4-inch layer.

Soil collections were placed in plastic bags, brought into the laboratory for drying and screening, preparatory to germination tests. Vermiculite will be used as a medium for germination. Half the residue will be refrigerated; the other, exposed for immediate germination.

Ecology Studies To Determine the Occurrence and Development of Ribes in Relation to Timber Cutting Practices, Slash Disposal Measures, and Ribes Eradication Methods

1. Timber cutting practices. The integration of timber cutting practices with blister rust control is being accomplished in cooperation with the Division of Timber Management, the Inland Empire Research Center, and Potlatch Forests, Incorporated. In 1955, new cuttings were added to studies in progress to determine the occurrence and development of ribes in relation to improvement cuttings in immature stands and partial cuttings, clear cuttings, and seed-tree cuttings in mature stands. Ribes ecology and silvicultural phases of timber cutting practice studies will be reported by research papers in cooperation with the Inland Empire Research Center.

2. Slash disposal measures. The job of integrating slash disposal measures with blister rust control is being accomplished in cooperation with the Idaho College of Forestry, the Inland Empire and Missoula Research Centers of the Intermountain Forest and Range Experiment Station, and the Division of Timber Management. A report of the progress of study is contained in the publication, "Logging Slash - A Study of the Problem in

Inland Empire Forests", D. S. Olson and George R. Fahnestock, University of Idaho, College of Forestry, Bulletin No. 1, July 1, 1955.

3. Ribes eradication methods. Spray areas are being studied to determine (1) the relation of ribes seed germination to spraying the second, third, and fourth years following prescribed broadcast burning, (2) the most advantageous time to rework spray areas in relation to new seed germination and the development of resprouting bushes, and (3) the potential ribes seedling problem on older cuttings following spraying where mature bushes have deposited considerable new seed. Data are not conclusive to report results of studies at this early date.

10 - DEVELOPMENT OF RUST RESISTANT WHITE PINE, 1955

R. T. Bingham, Forester

Routine work in selection, vegetative propagation, controlled pollination, flower induction and seed orchard technology, graft plantation establishment, transplanting test progenies, appraising rust on test progenies, and artificial inoculation proceeded on schedule. The most important work in 1955 was the appraisal of rust development in the progeny tests inaugurated in 1952 and 1953. Seedling progenies tested in the 1952 and 1953 trials are now beginning to give reliable information on the occurrence and degree of inheritance of rust resistance.

Testing First Generation Progenies for Inherited Rust Resistance

Promising preliminary results of 1954 persist. There is stronger evidence that a few of the parent trees are consistent in transmitting some degree of resistance to all their progenies; also, that a few of the progenies exhibit a fair degree of resistance. Needle spot examinations of three-year-old progenies (one year following inoculation) have shown these promising progenies to support only one-half to one-third as many needle spots per unit foliage sample as do ordinary progenies. In addition, canker inspections of four-year-old progenies (two years after inoculation) have shown that the same promising progenies probably contain between 20 and 30 percent resistant individuals. Examinations the second year after inoculation have also shown that in resistant progenies appearance of needle spot symptoms is often delayed, perhaps indicating that hyphal extension by the rust fungus is also delayed.

Among 24 parent selections included in the 1952 progeny tests, and another four parents represented in the 1953 trials, probably only one parent (selection No. 21) is outstanding in resistance transmission. Several others (58, 17, 25, and possibly 28 and 63) are of fair or uncertain value. Thus the return in high quality breeding material from testing about 30 selections is small, roughly three percent. Increased selection work followed by limited but more efficient pollination and testing procedures is strongly indicated if we are to uncover other selections like or better than No. 21. Since we now know that probably only two to three pollinations and progeny tests are necessary to prove the value of a given selection, the work should not be too costly.

Selection

Mr. Roger Billings, Diamond Match Company, and Mr. Marvin Riley, Clearwater National Forest, have aided in the location of two new rust-free selections in the heavy rust infection centers near Cedars Ranger Station, Clearwater National Forest.

Vegetative Propagation

Approach grafting (both scion and stock maintained on their own roots during the period required to make graft union) is eminently successful with western white pine. In a flower induction experiment, cooperator A. E. Squillace obtained 90 percent success through the first season, using potted five-year-old scion seedlings grafted on 10- to 35-year-old stock trees. This is by far the best grafting success we have ever obtained with western white pine.

Controlled Pollination

The 1955 pollinations were mostly restricted to repeating promising combinations found among the progenies of the 1952 and 1953 trials. Crosses 19x21 (91 bags), 21x17 and 17x21 (24 bags), 58x21 (30 bags), 25x21 (5 bags), 59x17 (12 bags), and 59x21 (11 bags) were repeated for larger scale production and retesting of progenies under conditions of both artificial and natural inoculation. A 115-bag test to determine effect of pollen parent on certain seed and cone characteristics was undertaken with Mr. Squillace.

White Pine Flower Induction and Seed Orchard Studies

Major emphasis in the work of cooperator A. E. Squillace of the Inland Empire Research Center, Intermountain Forest and Range Experiment Station, was given to the establishment of a number of semipermanent plot studies on flower induction and seed orchard technology. These included (1) a test of the value of topworking young scions on 10- to 35-year-old fruiting stock trees; (2) a paired-tree test designed to test the effects of watering, fertilizing, and cultivating trees now approaching fruiting age; (3) a test of the use of the heterotic hybrid of western x eastern white pine as a rootstock for encouraging early flowering; (4) a factorial test of all combinations of watering, fertilizing and cultivating five-year-old white pines; and next year (5) a paired-tree test of the effect of fertilizing fruiting age trees in stimulating cone and seed production.

Graft Plantation Establishment

About 8 acres of the 12½-acre Fernwood plot were staked and planted with 10 grafts of each of the 72 rust resistant selections found through 1954. This plot will become an important source of parental stock for future breeding work. Wide (20x20 feet) spacing and staggered row planting will allow open crown development and permit removal of poor clones for replacement with more promising materials for several years.

Artificial Inoculations

Spokane nursery inoculations of some 250 controlled and wind-pollinated progenies comprising the 1954 and 1955 progeny trials proceeded on schedule. Tentage was increased to allow the coverage of about 230 running feet of nursery bed involved in only two inoculation runs. Weather was good for both runs and although inoculum was not as heavily covered with fresh telia as in former years the spore casts indicated that uniform and probably adequate inoculation had taken place.

Four-year-old seedlings from the 1952 trials which had remained entirely rust free were reinoculated at Fernwood plot. Along with 50 control seedlings, 117 class "A" seedlings (prominent seedlings from portions of the nursery beds known to be heavily inoculated) and 242 class "B" seedlings (prominent seedlings from portions of the seedbeds known to have been inoculated less effectively) were treated. These elite seedlings, accumulated from all three outplanting plots, will now be stored at the Fernwood plot. It is beginning to appear probable that through repeated, massive, artificial inoculations it may be possible to infect any of the F_1 seedlings, even in the most resistant progenies. This reinoculation will help determine whether or not we now have immune seedlings. It will also help in making better selections among the best of the first generation seedlings, since it is desirable to have the most resistant individuals for second-generation breeding. The class "A" F_1 seedlings are now planted in a manner in which it will be possible to salvage several approach grafts of any seedlings which should become lethally infected through reinoculation. Thus we shall not lose the best germ plasm yet extracted by the test program. While it may be possible to infect all seedlings, it is quite probable that from infected (needle-spotted but as yet uncankered) seedlings still in place on the three outplanting plots will come additional and better breeding stock. Seedlings which remain uncankered after probable infection, as evidenced by needle spots, may represent even higher quality germ plasm. It would also appear that selected F_1 progenies showing resistance might be suitable for interim planting stock on areas with moderate or low rust hazard.

It has become increasingly apparent that effective inoculation procedure, coupled with good experimental design, is vital to securing reliable test results. Since in the last analysis individual seedlings must be appraised, adequate replication and continuity of design throughout both inoculation and test phases of the work are necessary. Use of a design which allows recognition of every seedling in every progeny under test, and the recognition of every other seedling adjacent at inoculation time, has proved invaluable in individual seedling rust reaction appraisal. An adequate number of replications of each progeny under test has helped in ironing out differences in local inoculation intensity, in seedling nutrition as affecting size, vigor, and amount of foliage on seedlings, and in the degree of screening afforded by seedlings in adjacent rows.

Outlook for Securing Resistant Planting Stock

Certain seedlings, principally of a few promising F_1 progenies, have resisted all types of infection through one or two massive artificial inoculations. Still other seedlings in the same progenies probably will survive even though supporting known needle infections. Together these two groups of seedlings will probably amount to 20 to 30 percent of the total number of trees tested in the progenies. While it is probable that eventually, through repeated artificial inoculations, it might be possible to infect all survivors, it is also believed that tests of the practical level of resistance, or field resistance, of these progenies should be undertaken before abandoning them as useful planting stock. Second-generation breeding promises still better progenies, but the interim period while awaiting production and testing of F_2 and/or backcross progenies

might well be employed producing interim stock of partial resistance to meet immediate planting needs. Work on this idea has already begun with the large-scale pollinations of 1955 which repeated the promising F_1 crosses 19x21, 21x17, 58x21, etc. If seed yield from these pollinations is adequate, we propose to plant several small acreages and test the practical use of the first generation stock. Stock for retesting of promising progenies under artificial inoculation conditions, and for top-working or other flower induction work aimed at hastening production of the second generation flowers, will also be available. In general, it would appear that the outlook for the eventual production of planting stock with a useful degree of blister rust resistance is good.

MAINTENANCE AREA PLOT

During July through September 1955, all permanently tagged trees on the Elk Creek maintenance plot were reinspected, and the entire six-square-mile area with adjacent lands was given an intensive post check. Early results indicate the possible existence of correlations between occurrence of recent rust infection and proximity to stream-type ribes; also, the possibility of a rust gradient increasing with proximity to known ribes concentrations some distance outside the plot. Detailed analysis will not be possible until all rust and ribes distribution and frequency data are plotted on base maps. When this information is assembled, it may be possible to issue a serial report covering findings to date.

MATURE PINE RUST DAMAGE PLOT

A permanent plot for investigating blister rust damage in mature western white pine stands was established at Turner Creek, St. Joe National Forest, during June and July 1955. Establishment work was done cooperatively; Blister Rust Control provided a chief of party and forestry aid as a high-climbing crew and the Inland Empire Research Center of the Intermountain Forest and Range Experiment Station provided a forestry aid as recorder.

Mature damage surveys of 1951 had confirmed the belief that serious losses due to blister rust were occurring in mature white pine stands. Rust examinations and loss predictions made then disclosed that mature stands in three Upper St. Joe River drainages ranged from about 60 to 80 percent lethally infected, with a remaining life span predicted at between 20 and 30 years. Since these life span predictions were based in part on fragmentary evidence concerning time elapsed between canker girdling and top flagging and on time between top flagging and tree death, they were in need of additional investigation. Also, to be of practical value, prediction methods would have to be adapted to use from the ground by either surveymen or timber markers. Firming up the existing prediction methods and determining their practical use were the main purposes for the establishment of the permanent plot.

From the 1951 surveys it appeared that current extent of trunk canker encirclement, position of the canker in relation to the tree live crown, surrounding canopy density at the canker height, and dominance of the lethally infected tree were probably the most important factors affecting time of top flagging and duration of tree life following top flagging. Accordingly, the study was aimed mainly at appraising the effect of these four factors. Selection of study trees was executed as follows:

	Number of Trees Examined	
	Lowest Lethal Canker	Most Advanced Lethal Canker
1. Dominant and co-dominant trees with trunk canker in lower 1/3 of live crown	9	(0)
2. Ditto with canker in central 1/3 of live crown	36	(8)
3. Ditto with canker in upper 1/3 of live crown	10	(20)
4. Intermediate or suppressed tree with trunk canker in lower 1/3 of live crown	7	(1)
5. Ditto with canker in central 1/3 of live crown	22	(7)
6. Ditto with canker in upper 1/3 of live crown	4	(13)
Total	88	

Most of the study trees had two to several lethal cankers, and on 49 trees both the lowest lethal infection and a more advanced lethal infection higher on the trunk were examined. Frequencies of the more advanced infections are shown by the numbers in parentheses above.

Initial reinspection will be made in 1956. Twelve of the study trees exhibited yellowing of the top, which immediately precedes top flagging. Death of the entire top probably will occur within the next two years. Also, Dendroctonus spp. beetles are attacking some climbing-spur injured trees. After the initial 1956 inspection, depending on the number of yellow tops then dead, subsequent reinspections can be made during late summer every other year.

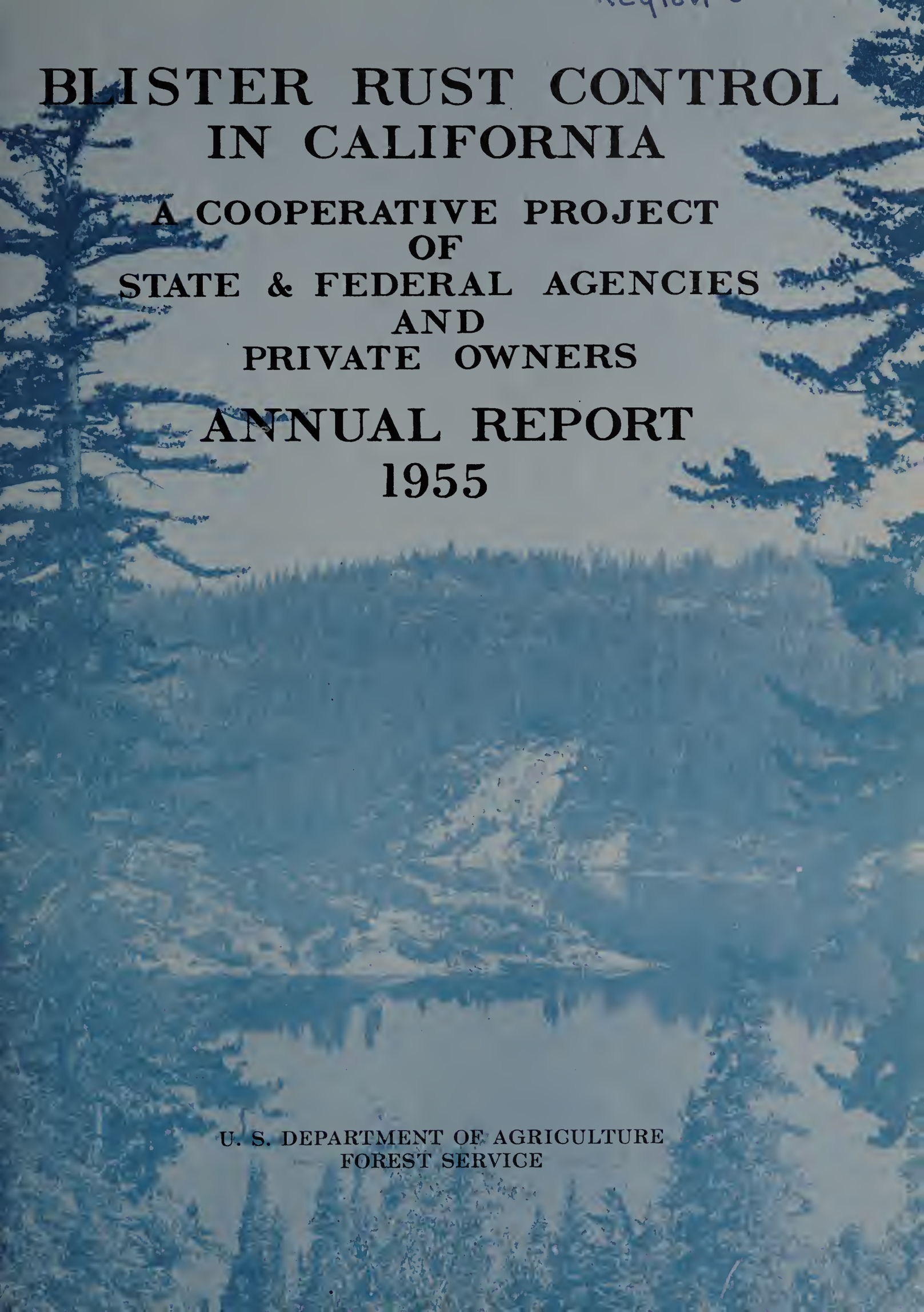
Preliminary results to date are as follows: (1) About 75 percent of the lowest lethal cankers on study trees could be seen from the ground when the tree was observed from perhaps 100 feet out from all sides with the aid of binoculars; 65 percent of the most advanced lethal cankers (usually situated higher on the trunk) could be thus seen. Canker visibility increased directly with degree of slope. It was easier to see and estimate effects of cankers viewed along a more nearly horizontal line of sight (possible on steep to moderate slopes) than when the observer was in a creek bottom level with the tree bases and had to look through rather than between the branch whorls. (2) Ground observation, when cankers can be seen, is probably adequate for estimating cankered trunk diameter, extent of girdling, and position of canker in relation to tree live crown as well as for estimating time of top flagging and tree death. Estimates of time of tree death made from the ground averaged only two years difference from those made from a close examination of the canker during high climbing. Average time of death of tree estimated from ground observations on 56 cankers was 17.6 years; from high-climbing observations, 17.2 years.

The Turner Creek plot area is now set up for observation through 1975, covered by a memorandum of understanding between the Division of Blister Rust Control and the St. Joe National Forest.

BLISTER RUST CONTROL IN CALIFORNIA

A COOPERATIVE PROJECT OF STATE & FEDERAL AGENCIES AND PRIVATE OWNERS

ANNUAL REPORT 1955



U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

A N N U A L R E P O R T

ON

THE CONTROL OF WHITE PINE BLISTER RUST

IN CALIFORNIA

FOR THE

CALENDAR YEAR 1955

BLISTER RUST CONTROL UNIT - T. H. HARRIS, CHIEF

METHODS DEVELOPMENT UNIT - H. R. OFFORD, CHIEF

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
CALIFORNIA REGION

1955

CONTENTS

CONTROL PROGRAM

The Blister Rust Control Program - 1955 . . . . . 1- 7

Cooperative Work on State and Private Lands 8-10

The National Forest Project 11-12

The National Park Project 13-15

Table 1 - Status of Ribes Eradication in California as of December 31, 1955 16

Table 2 - Summary of Ribes Eradication in California - 1955 17

METHODS DEVELOPMENT PROGRAM

Highlights 18-20

Ribes Ecology in California and Oregon - 1955 21-24

Further Development of Chemical-Eradication Methods For Control of Ribes in California - 1955 25-28

Disease and Survey Studies in California and Oregon . . . 29-34

THE BLISTER RUST CONTROL PROGRAM - 1955

By

Benton Howard, Assistant Chief

The continuance of sugar pine and the other white pines as significant forest types in most areas in California is dependent on controlling white pine blister rust. This is accomplished by the eradication of the wild currants and gooseberries (ribes spp.) from stands selected for their commercial, recreational, aesthetic, or scientific values. The protection of white pines in California is a cooperative project conducted by the State of California, the private owners, and the Federal Government.

THE JOB IN CALIFORNIA

During the past few years the most valuable young commercial stands of sugar pine and some of the most important recreational and aesthetic sugar and other white pine stands have been selected for protection from white pine blister rust.

ACREAGE OF THE SELECTED STANDS WITHIN THE CONTROL UNITS

Ownership	Commercial Forest	Recreational or Aesthetic Forest	Total	Per Cent Initially Worked
Private	225,089	-	225,089	79
State of California	3,726	4,203	7,929	89
National Forest	235,730	-	235,730	78
National Park	-	159,389	159,389	91
Totals	464,545	163,592	628,137	82

The commercial sugar pine forests were selected on an economic basis following the precepts outlined in the bulletin, "Economics of the Young-Growth Sugar Pine Resource," by Henry J. Vaux. The 464,545 acres selected are approximately 20 per cent of the 2,255,000 acres of commercial white pine type in California. The 163,592 acres of recreational and aesthetic forest land were selected on a basis of important park values by the Federal and State Park Services with the technical assistance of the Blister Rust Control Unit.

BLISTER RUST DAMAGE APPARENT

Significant blister rust damage is now easily visible in many parts of northern California. Infections which became established in 1944 and 1948 are now beginning to kill the limbs and tops of saplings, poles, and young-mature white pine trees. Many small trees have been killed and in some places sugar pine and other white pine reproduction is disappearing from the stand. Until 1955 blister rust infection while present has been quite inconspicuous since it requires from 6 to 10 years after infection for the damage to become obvious. Infection is general and damage is severe in the white pine stands of the Klamath, Scott, Salmon, upper Sacramento, McCloud, and Pit River drainages where in many places blister rust infection occurs on over one-half of the immature trees in the stands.

Severe blister rust infection occurred in 1944 and 1948 on sugar pine in the Lookout Point area near McCloud on the Shasta-Trinity National Forests. An area of approximately 2,200 acres was selected for sugar pine management in 1952 and ribes eradication was begun in 1953. Blister rust cankers were pruned from 3,470 infected sugar pine crop and potential crop trees on 310 acres of this area. Other sugar pines were so badly infected that pruning was impractical since they had bole cankers or the tops were already killed. On the area treated 11 sugar pines per acre, or about one-third of the remaining young sugar pines, were pruned. Comparable infection exists on several thousand acres in this vicinity and in many other areas in the North Coast and Cascade ranges of California.

Blister rust is now present on sugar pine in many stands between the Pit River and Highway 40, the sugar pines in some areas being heavily infected. A previously unknown infection center on sugar pine was discovered along Empire Creek near Downieville in Sierra County. A systematic survey on 183 acres of this center indicates that there are 13 infected trees per acre, about 25 per cent of the sugar pine stand.

As a result of infection which occurred in 1944 and 1948 prior to any ribes eradication, 1,267 acres of national forest land were eliminated from the sugar pine management areas near Downieville in Sierra County. Nearly 10 per cent of the sugar pine crop trees became infected before control measures were started. This infection has significantly increased the cost of protection due to the closer degree of ribes suppression that must be maintained continually. Due to the increased cost of protection and the losses in sugar pine crop trees, protection of these stands seems to be no longer economically feasible.

Scattered blister rust infections occur southward from Highway 40 to Dodge Ridge in Tuolumne County on the Stanislaus National Forest. Some local areas have substantial amounts of infection while others have but a few infected trees.

Severe blister rust infection is present in the high elevation white pines in the Marble Mountains in western Siskiyou County, and heavy losses are beginning to occur in white bark pine (Pinus albicaulis) and western white pine (P. monticola).

INFECTION STATIC WITHIN MANAGEMENT AREAS

No significant increase of infection has been observed within any of the sugar pine management areas. A review of data on the 33 known blister rust infection centers in the Eldorado National Forest reveals that 31 of these, having 707 infected trees were either established prior to any ribes eradication or are outside the sugar pine management areas where no protective work has been done. Only two infection centers having a total of 4 infected trees have become established after ribes eradication was started, and they were established before ribes suppression to the required standards was reached.

KNOWN RANGE OF INFECTION EXTENDED

Sugar pines infected with blister rust were found near Whitehorse in Modoc County and near Chester in Plumas County. Infected white bark pines (P. albicaulis) were discovered on Haight Mountain near Tennant in Siskiyou County. These finds extend the known range of infection nearly to the eastern edge of the white pine type. No infection south of the previously discovered infection on Dodge Ridge in Tuolumne County was found.

COOPERATION

The protection of sugar pine in California is a cooperative undertaking of the private owners, the State of California, and the Federal Government. Funds have been adequate to accomplish the needed work. The financing available by fiscal years 1955 and 1956 is shown below:

FUNDS

Fiscal Year	State of California	Private Owners	Federal Allotments				Total
			State & Private Lands	National Forest Lands	National Park Lands	Technical Direction & Methods Development	
1955	$125,000	$5,350	$40,000	$279,000	$197,170	$126,000	$772,520
1956	$125,000	$4,700	$52,000	$273,000	$207,000	$132,000*	$793,700

*$89,000 for technical direction and $43,000 for methods development and disease surveys.

The encouragement and strong financial support given by the State of California make possible the protection of the sugar pine stands on private land. California is outstanding among the states in its assistance and encouragement to timber owners. The State also finances the entire costs of blister rust control on State lands.

Three owners began financial cooperation during 1955. This brings the total number of financial cooperators to eight. Statements of understanding, but with no financial cooperation, were made with 17 owners during the year, bringing to 32 the number of owners who now participate in this manner. These 40 owners have 132,000 acres within the sugar pine management areas. Discussions with nonparticipating owners are being carried on. Continued efforts are being made in line with State policy to encourage more owners to share the cost of protecting their sugar pine. Control work is being done only on the lands of the participating owners.

THE 1955 SEASON

Control treatment to the degree required by the extent of the rust where present or by ecological requirements in the uninfected stands was done on 48,481 acres.

SUMMARY OF RIBES ERADICATION - 1955

Project	Acres Worked	Acres Checked and Meeting Standards	Acres Total	Total Man Days	Thousands of Ribes Destroyed	Total Acres Checked	Contract Eradication Acres Worked	Contract Eradication Av. Price Paid Per Acre
State & Private	9,534	3,884	13,418	5,869	1,642	31,609	8,564	$7.27
National Forest	16,417	8,073	24,490	8,062	1,719	63,309	14,437	6.44
National Park	8,313	2,260	10,573	5,010	567	26,285	1,592	9.18
Totals	34,264	14,217	48,481	18,941	3,928	121,203	24,593	$6.90

Contractors did most of the ribes eradication in the commercial forests. Some hired labor was used on small scattered areas and in the application of chemical herbicides. On the national park project most of the work was done by hired crews.

The herbicidal chemicals, 2,4-D and 2,4,5-T, remain the most economical way to treat dense concentrations of ribes. The present status of the chemical work is given below:

CHEMICAL WORK

Period	Acres Treated	Thousands Gallons of Spray
1955	340	139
1946-55	14,820	2,248

Two nurseries growing sugar pine planting stock were treated during the year. The California Division of Forestry nursery near Magalia in Butte County was checked and ribes were removed from the nursery and the surrounding protective zone. The U. S. Forest Service nursery near McCloud on the Shasta-Trinity National Forests, which was last worked in 1951, was re-examined and a few ribes were removed. These two nurseries are now elegible to ship under proper permit sugar pine planting stock into uninfected areas.

Ribes were removed from a small area adjacent to the Institute of Forest Genetics near Placerville to protect the white pine hybrids growing there.

SUGAR PINE MANAGEMENT

Gratifying progress was made in the field of sugar pine management during 1955. The California Region prepared and issued a handbook on sugar pine management entitled "Let's Grow Sugar Pine" in which guidelines were established for more intensive management and for the silvicultural marking of timber within the sugar pine management areas on national forest lands.

Many of the forests are developing special marking rules on individual sales designed to give the maximum benefit to sugar pine. Emphasis is given during the sale to protecting and releasing existing sugar pine reproduction. Small areas are being clear cut for artificial regeneration where existing coniferous reproduction is unsatisfactory and the overstory is mainly mature fir.

A pilot sale on the sugar pine management area at Soda Springs in the Lassen National Forest was logged late in 1954. Pruning, slash disposal, and seed spotting on several small areas were done in 1955. Results are encouraging, and this area will be closely observed in order to apply elsewhere the knowledge and experience acquired here.

Under the leadership of the California Forest and Range Experiment Station an annotated bibliography on sugar pine management has been prepared. This is now being processed and will be issued early in 1956.

The pilot study of salvage pruning of infected sugar pine at Lookout Point on the Shasta-Trinity National Forests was continued. Blister rust infection has been removed from 3,470 sugar pine crop and potential crop trees. The data are now being analyzed to determine costs and to establish adequate operating procedures. This area will be studied closely in the next few years to determine if salvage pruning of infected trees is feasible and can be done effectively at a reasonable cost.

SIX SPECIES OF WHITE PINES IN CALIFORNIA

There are six species of white pines in California. Only sugar pine (Pinus lambertiana) is of major commercial importance as a timber tree. The others, western white pine (P. monticola), white bark pine (P. albicaulis), foxtail pine (P. balfouriana), limber pine (P. flexilis), and bristlecone pine (P. aristata) grow at the higher elevations. In small local areas western white pine has commercial timber value. These high elevation white pines have important recreational, aesthetic, and scientific values. In some instances they may require consideration in watershed management.

The National Park Service has selected stands having major park values for protection from blister rust. The State of California has some aesthetic and recreational stands being protected in the Calaveras Big Trees State Park.

Sugar pine in commercial stands is the only species on national forest lands now being protected. A reconnaissance was made on the Inyo National Forest to appraise the feasibility and cost of protecting high elevation white pines on national forest lands from blister rust. Excellent stands of white bark pine, foxtail pine, bristlecone pine, limber pine, and western white pine grow in many localities. In numerous instances they are the principal species present and often one or more of them grow in pure white pine stands. The protection of the stands observed is entirely feasible at costs comparable to the work now being done in the national parks. At present the policy in the California Region is to protect only commercial stands that qualify economically. Consideration should be given to determining the need for protecting some of the high elevation recreational and aesthetic stands and a policy established.

FOR 1956

Increased effort should be given in these fields:

1. Continue to work with the private owners to secure a better understanding of the present methods being used and objectives of the program.

2. Research on the silviculture of sugar pine and on blister rust spread and behavior should be intensified by the appropriate public agencies.

3. Intensify management on the sugar pine areas. Put into practice all accepted procedures.

4. Continue the reconnaissance of the high elevation white pines in the national forests and work toward the formulation of a policy for their protection from blister rust.

During 1955 the control of blister rust on state and private lands was continued as a cooperative project by the California Division of Forestry of the Department of Natural Resources, private timberland owners, and the U. S. Forest Service. The work was conducted on selected sugar pine stands in 16 counties extending from Siskiyou County in northern California to Tulare County in the central part.

FINANCING

Acting as an agent for the State, the U. S. Forest Service under cooperative agreement conducts the control project and expends the State, Federal, and private funds allotted for the work.

The State of California assumes the full cost of the control work on State lands. Control work on privately owned lands is financed jointly by the State of California, the Federal Government, and private timberland owners. Funds available for work on private and state lands in fiscal year 1956 are shown below:

COOPERATIVE FUNDS

State of California	Private Owners	Federal Funds	
		Direct Allotment	Technical Direction & Methods Development
$125,000	$4,700	$52,000	$50,920

California's strong support for the protection of sugar pine resources in private ownership is the one factor which has made possible planned and continuing blister rust control work on privately owned lands. Without this support it is doubtful that any but a very few owners could have undertaken blister rust protection projects at this time. The State of California in this way has made possible the inclusion of some of the most productive sugar pine lands in the State in a balanced and coordinated program for the production of future crops of this valuable resource. State participation has also encouraged some private owners to help finance the work on their lands. It is expected that more will share in the cost of the work in the future.

POLICY

A cooperative agreement between the State of California and the Federal Government for the conduct of the work has been in effect since 1941. The agreement was revised in 1955 to meet changing conditions.

The California State Board of Forestry in a June 1955 meeting continued the blister rust policy for private and state lands that became effective in 1954 with the following principal revision:

> "It is recommended that private landowners in recognition of the benefits resulting from the control of blister rust be encouraged to contribute not less than 25 per cent of the actual field cost of the job."

Blister rust control work on private lands is confined to the lands of the owners who have expressed a desire to retain the land in sugar pine production. Agreements have been executed with 40 owners covering 132,000 acres of privately owned land in sugar pine management units. This is an increase of 26 participating owners over the 14 in 1954.

STATUS OF CONTROL

Ribes have been removed initially from 89 per cent of the 7,929 acres of State-owned lands within blister rust control units. Follow-up work is progressing according to schedule and suppression of ribes to a maintenance condition has been achieved on 36 per cent of the control units.

At present 225,089 acres of privately owned land have been appraised and found to qualify under the economic formula for sugar pine management and blister rust control. Initial ribes removal has been performed on 79 per cent of the control area and 11 per cent is in a maintenance condition.

ACCOMPLISHMENTS IN 1955

Blister rust control work was done in selected sugar pine stands in Siskiyou, Shasta, Tehama, Butte, Plumas, Lassen, Yuba, Sierra, Eldorado, Amador, Calaveras, Tuolumne, Mariposa, Madera, Fresno, and Tulare Counties during 1955.

During the year ribes were removed from 9,534 acres, and 3,884 acres met the required standards without work. The contract program accounted for 89 per cent of the work done at an average bid price of $7.27 per acre. This is approximately one dollar per acre higher than the past two years and was due to contracting the work on areas supporting heavy concentrations of ribes in Plumas and Fresno Counties. The range of bid prices was from $2.74 per acre in Eldorado County, an all time low, to $10.12 per acre in Fresno County. The remaining work was done by hired labor and inmates from the Honor camps at Mt. Home State Forest in Tulare County and Magalia in Butte County.

Chemical eradication by foliage application of 2,4-D and 2,4,5-T herbicides with power spray equipment was limited to small areas in Butte, Plumas, and Eldorado Counties supporting extremely heavy ribes populations.

Checking surveys to determine compliance with contract specifications and for planning future work covered 31,609 acres.

The scheduled work in Calaveras Big Trees State Park was completed at an average bid price of $6.15 per acre. Of the 1,818 acres scheduled for treatment 969 acres required work and 849 acres met standards without work.

Ribes removal from the sugar pine management units of the Mt. Home State Forest was initiated this season. A crew of 10-12 inmates from the Honor Camp at Bear Creek covered 300 acres and removed 77,000 ribes.

An inspection of the Magalia Nursery and adjacent area revealed that 258 acres supported ribes above allowable standards. The area was worked by an inmate crew from Camp Magalia.

Additional young sugar pine stands were delineated and evaluated under the economic standards developed by Henry J. Vaux in his bulletin, "Economics of the Young-Growth Sugar Pine Resource." The largest block qualifying was a 4,000-acre unit in the vicinity of Whitehorse in Siskiyou and Modoc Counties. The area was inspected by the owners and by representatives of the Blister Rust Control Unit and will be included in the control units.

At the request of the State Division of Beaches and Parks an appraisal of control costs on D. L. Bliss and Emerald Bay State Parks was made.

Sugar pine management units totaling 235,730 acres have been selected from the best sugar pine stands on national forest lands for growing future crops of sugar pine. These stands are being protected from white pine blister rust and will receive intensive management measures intended to increase the quality and quantity of the crop. Only those commercial sugar pine stands on which it seems probable that the return will exceed the cost are receiving cultural treatment and protection from blister rust. The combined costs of blister rust protection, silvicultural treatment, and interest charges have been compared with the expected harvest value in selecting the units.

STATUS OF RIBES ERADICATION

Initial ribes eradication has been completed on 78 per cent of the 235,730 acres within the sugar pine management units, while 9 per cent of the total area is now on maintenance and will require relatively little work in the future. Priority has been given to the eradication of ribes which have become re-established on cut-over lands previously worked and to initial ribes eradication on newly logged lands. All work on cut-over lands is up to schedule. Most of the unworked areas support mature stands which will be logged soon and with ribes eradication scheduled to follow.

THE 1955 SEASON

Ribes were eradicated from 16,417 acres of national forest lands, with an additional 8,073 acres being surveyed and found to meet the required standards.

The bulk of the ribes eradication job, 88 per cent, was performed by contractors at an average price of $6.44 per acre. This is a decrease of $1.20 per acre from the 1954 average. The work on the Shasta-Trinity, Sierra, and Sequoia National Forests was in areas of fewer ribes than in 1954 with resulting lower prices. The abnormally low average of $3.06 per acre on the Eldorado National Forest due to an excess of contractors accounts for part of the decrease. Nearly all old contracts on which extensions were required were finished and very few 1955 contracts required extensions to 1956.

Power spray equipment was used on the Plumas, Stanislaus, and Sequoia National Forests for the chemical eradication of ribes by foliage application of 2,4-D and 2,4,5-T herbicides. The crews treated ribes on 308 acres.

Four small multi-purpose and multi-financed camps were operated to facilitate the work. They were:

Forest	Camp	Purpose
Shasta-Trinity	Bartle	Administration-Checking Surveys
Lassen	Spring	Administration-Checking Surveys
Plumas	Strawberry	Chemical Spray
Sequoia	Bearskin	Chemical Spray-Checking Surveys

Ribes surveys were made on 63,309 acres to determine compliance to contract specifications and for planning future work.

SUGAR PINE MANAGEMENT

The intensive management of the sugar pine areas was greatly accelerated during 1955. The revised handbook on sugar pine management, "Let's Grow Sugar Pine," issued by the Division of Timber Management, Region 5, outlines the desired practices and procedures.

The basic management policy is stated therein as:

> "The sugar pine management areas are selected and established to grow a premium crop for premium values and returns on an economic basis. This means that the quality and quantity of sugar pine must be maintained and improved through the use of specific silvicultural and management measures. The Forests are encouraged and expected to put into practice within the management areas all measures that will result in increasing the amount of sugar pine grown on the area and in bettering its quality."

The goal is stated in the handbook as:

> "The intensity of management on the sugar pine areas should be increased to the fullest extent possible within the limitations imposed by funds and personnel."

All sales within the sugar pine management areas on the Forests that were prepared in 1955 followed the above precepts. Special marking rules to fit the silvicultural requirements of the specific areas were prepared on several Forests.

White pine blister rust control projects are being conducted by the National Park Service on Yosemite, Sequoia, Kings Canyon, and Lassen Volcanic National Parks. The Park Service has selected for protection from blister rust superior stands of four white pine species in California as shown in the following table:

ACREAGE BY SPECIES

National Park	Acres				Total Acres
	Sugar Pine	Western White Pine	Foxtail Pine	White Bark Pine	
Lassen Volcanic	1,120	20,581	-	3,121	24,822
Yosemite	88,126	-	-	-	88,126
Sequoia - Kings Canyon	30,926	1,600	13,915	-	46,441
All	120,172	22,181	13,915	3,121	159,389

Control work was done on all the Parks in 1955. The projects were administered by the Park Service with leadership and technical direction being furnished by the Blister Rust Control Unit.

PARKS IN SOUTHWEST EXAMINED

Personnel of the Blister Rust Control Unit accompanied by National Park Service officials of Region 3 inspected the white pine stands in Bryce Canyon National Park and Cedar Breaks, Saguaro, and Chiricahua National Monuments to assess the potential blister rust control problems in these areas. Bryce Canyon and Cedar Breaks are not, at present, threatened by the rust and Saguaro and Chiricahua are believed to be ribes free. For the present no control work is needed.

YOSEMITE

Three small camps (15-20 men each) operated in Yosemite National Park in 1955. Work at the Crane Flat and Chinquapin Camps was confined to ribes reeradication and maintenance work, much of which was done by specially trained men working as checker-flankers or as spot-work crewmen. This work will be continued next year. The Deer Camp crews were engaged in initial ribes eradication in the area adjacent to that worked from the Chilnaulna pack camp in 1954. Ribes eradication by contract was confined chiefly to initial work in the Bald Mt. unit. In that area all contract work except one 80-acre item was completed on schedule. On August 1, 1955 awards were made on contracts totaling 1,031 acres at the average bid price of $9.90 per acre, the work to be completed by September 15, 1956. Since most of this area is quite inaccessible, few bidders were interested.

The checking surveys, mainly checker-flanker work at the Crane Flat and Chinquapin Camps and regular check on contract areas were handled by a checker foreman and 11 checkers. An advance check was made on the Little Yosemite Valley unit where ribes will be removed initially next year by a 10-man pack camp crew. The Base Line Camp will be reopened and operated in 1956 for ribes reeradication work and a post check survey on the Smith Meadows area.

SEQUOIA - KINGS CANYON

During the 1955 season in Sequoia - Kings Canyon National Parks an 8-man pack-camp crew completed the reeradication of ribes in the Chagoopa foxtail pine unit. This unit, which is now nearing maintenance, will be inspected in 1956 to determine if any clean-up work is needed. The other high country units, Mt. Whitney and Heather Lake, are on maintenance. These high elevation areas will require very little future work. The crew of 20 men at the Red Fir Camp was engaged in the inspection of maintenance and near-maintenance areas, stream type maintenance work, and ribes reeradication on the areas supporting a regrowth of Ribes tularense. This work will be continued in 1956.

LASSEN VOLCANIC

In Lassen Volcanic National Park a post check (ribes survey) to determine the extent of any ribes regeneration was made on much of the area last worked in 1950. The survey will be completed in 1956, and any areas on which ribes have become re-established will be worked. Indications are that few areas will require treatment.

The Park Service added the Juniper Lake area to the control program. This unit of 6,768 acres has extensive western white pine stands. Ribes and white pine surveys were made in 1939, but the area had not been previously included. Development of the area and extensive public use are now contemplated, and protection of the white pines from blister rust is desired. Initial ribes eradication was started in 1955 when contracts were let for over one-half the required work. Even though the completion dates were for 1956, several contractors finished their work during the fall. The remaining work will be contracted in 1956.

The Sulphur Works unit was extended to include the Mineral Entrance; work on the additional 275 acres will be done in 1956.

RUST SPREAD

Scouting in Lassen Volcanic National Park revealed blister rust infection on 11 sugar pines along Geyser Creek in the southeastern corner of the Park. This infection is about three air line miles from the Kings Creek infection found in 1954. Both infection centers are outside the control units, and all found cankers have been removed.

In Yosemite National Park all localities previously classed as good rust introduction sites were re-examined. Forty samples of rust were collected in 1955, but all have been identified as pinyon rust (Cronartium occidentale). The Spider Meadow area was examined with extreme care this year since the laboratory determination of the rust found on ribes there in 1954 was inconclusive. No rust-infected ribes or pines were found in 1955 at Spider Meadow, suggesting that blister rust is not present here. All the areas will be re-examined in 1956.

TABLE 1

STATUS OF RIBES ERADICATION IN CALIFORNIA AS OF DECEMBER 31, 1955

Ownership	Control Operation	Control Units		Status of Ribes Eradication			
				Net Acres by Workings			
		Total Acres	Acres Unworked	Initial	Reerad.	Maint. Work	Acres on Maint.
WORK DONE BY THE STATE COOPERATIVE PROJECT							
PRIVATE LAND	Mendocino (Glenn County)	600	600	-	-	-	-
	Klamath (Siskiyou County)	2,545	-	2,545	4,219	1,980	2,545
	Shasta-Trinity (Siskiyou and Shasta Counties)	4,279	1,336	2,943	110	-	-
	Lassen (Tehama, Butte, Plumas, and Shasta Counties)	92,466	24,815	67,651	73,545	185	13,535
	Plumas (Plumas, Butte, Yuba, and Sierra Counties)	24,653	5,216	19,437	30,919	-	-
	Tahoe (Sierra, Nevada, and Placer Counties)	1,947	680	1,267	-	-	-
	Eldorado (Eldorado, Placer, and Amador Counties)	42,120	7,164	34,956	56,850	-	3,893
	Stanislaus (Calaveras and Tuolumne Counties)	43,023	3,030	39,993	51,369	-	5,574
	Sierra (Mariposa, Madera, and Fresno Counties)	13,456	3,781	9,675	7,285	-	250
	TOTAL	225,089	46,622	178,467	224,297	2,165	25,797
STATE LAND	Latour State Forest	1,878	479	1,399	320	-	320
	Blodgett Forest-Univ. of Calif.	1,160	-	1,160	2,478	-	-
	Calaveras Big Trees State Park	4,203	-	4,203	7,916	-	2,507
	Mountain Home State Forest	688	388	300	-	-	-
	TOTAL	7,929	867	7,062	10,714	-	2,827
TOTAL STATE AND PRIVATE		233,018	47,489	185,529	235,011	2,165	28,624
WORK DONE BY THE FOREST SERVICE							
NATIONAL FOREST LAND	Mendocino	4,200	3,654	546	-	-	-
	Klamath	2,238	-	2,238	2,326	667	2,238
	Shasta-Trinity	5,707	905	4,802	406	-	-
	Lassen	15,925	3,658	12,267	7,943	-	501
	Plumas	56,765	11,284	45,481	61,026	728	1,986
	Tahoe	17,456	969	16,487	4,586	-	-
	Eldorado	35,655	8,104	27,551	27,375	-	1,899
	Stanislaus	43,375	1,888	41,487	81,507	-	13,086
	Sierra	48,016	19,878	28,138	32,049	-	500
	Sequoia	6,393	1,067	5,326	-	-	-
	TOTAL	235,730	51,407	184,323	217,218	1,395	20,210
WORK DONE BY THE NATIONAL PARK SERVICE							
NATIONAL PARK LAND	Lassen Volcanic	24,822	5,913	18,909	23,498	34	15,577
	Yosemite	88,126	7,554	80,572	97,221	4,742	54,217
	Sequoia-Kings Canyon	46,441	-	46,441	54,287	1,062	33,694
	TOTAL	159,389	13,467	145,922	175,006	5,838	103,488
ALL WORK DONE IN CALIFORNIA							
ALL CONTROL OPERATIONS		628,137	112,363	515,774	627,235	9,398	152,322

TABLE 2

SUMMARY OF RIBES ERADICATION IN CALIFORNIA - 1955

Ownership	Control Operation		Acres Worked (Contract And Camp Crews)	Acres Checked And Meeting Standards Without Work	Acres Total	Total Man Days	Thousands of Ribes Destroyed	Total Acres Checked (All Classes)	Contract Eradication: Acres Worked	Contract Eradication: Average Price Per Acre Paid to Contractor
WORK DONE BY STATE COOPERATIVE PROJECT										
PRIVATE LAND	Shasta-Trinity (Siskiyou and Shasta Counties)		1,442	-	1,442	976	216	2,200	1,292	$7.92
	Lassen (Tehama, Butte, Plumas, and Shasta Counties)		1,894	2,116	4,010	1,245	155	8,439	1,894	7.20
	Plumas (Plumas, Butte, Yuba, and Sierra Counties)		1,903	656	2,559	844	301	7,427	1,880	8.37
	Eldorado (Eldorado, Placer, and Amador Counties)		1,460	213	1,673	521	85	3,773	989	2.74
	Stanislaus (Calaveras and Tuolumne Counties)		298	-	298	117	170	458	298	6.76
	Sierra (Mariposa, Madera, and Fresno Counties)		1,110	50	1,160	1,235	531	4,690	1,110	10.12
STATE LAND	Blodgett Forest-Univ. of Calif.		158	-	158	45	3	340	158	4.90
	Calaveras Big Trees State Park		969	849	1,818	312	104	4,042	943	6.15
	Mountain Home State Forest		300	-	300	574	77	-	-	-
ALL WORK DONE BY THE STATE COOPERATIVE PROJECT		Initial Work	4,925	490	5,415	4,148	1,048			
		Reeradication	4,609	3,394	8,003	1,721	594			
		All	9,534	3,884	13,418	5,869	1,642	31,609	8,564	$7.27
WORK DONE BY THE FOREST SERVICE										
NATIONAL FOREST LAND	Mendocino		516	30	546	202	30	2,020	516	8.62
	Shasta-Trinity		1,324	-	1,324	522	108	3,680	783	7.31
	Lassen		2,068	357	2,425	1,015	146	4,571	2,068	8.49
	Plumas		3,058	2,990	6,048	1,314	331	8,832	2,402	9.15
	Tahoe		1,931	107	2,038	1,684	319	4,436	1,874	7.04
	Eldorado		2,464	1,006	3,470	798	176	7,951	2,454	3.06
	Stanislaus		2,260	2,533	4,793	816	317	9,642	2,051	4.59
	Sierra		796	315	1,111	763	108	18,669	796	5.66
	Sequoia		2,000	735	2,735	948	184	3,508	1,493	5.76
ALL WORK DONE BY THE FOREST SERVICE		Initial Work	8,527	1,015	9,542	4,982	1,110			
		Reeradication	7,162	7,058	14,220	2,995	606			
		Maint. Work	728	-	728	85	3			
		All	16,417	8,073	24,490	8,062	1,719	63,309	14,437	$6.44
WORK DONE BY THE NATIONAL PARK SERVICE										
NATIONAL PARK LAND	Lassen Volcanic		1,073	635	1,708	356	73	8,276	886	8.69
	Yosemite		5,752	-	5,752	3,570	409	16,258	706	9.80
	Sequoia-Kings Canyon		1,488	1,625	3,113	1,084	85	1,751	-	-
ALL WORK DONE BY THE NATIONAL PARK SERVICE		Initial Work	2,204	244	2,448	1,618	356			
		Reeradication	2,493	2,016	4,509	1,831	153			
		Maint. Work	3,616	-	3,616	1,561	58			
		All	8,313	2,260	10,573	5,010	567	26,285	1,592	$9.18
ALL WORK DONE IN CALIFORNIA										
ALL OWNERSHIPS ALL AGENCIES		Initial Work	15,656	1,749	17,405	10,748	2,514			
		Reeradication	14,264	12,468	26,732	6,547	1,353			
		Maint. Work	4,344	-	4,344	1,646	61			
		All	34,264	14,217	48,481	18,941	3,928	121,203	24,593	$6.90

BLISTER RUST CONTROL METHODS DEVELOPMENT DURING 1955

SECTION I. HIGHLIGHTS

By H. R. Offord, Chief

Blister rust control methods development in R-5 and R-6 was continued in accordance with the Annual Program Plans (Chief's office) and the Annual Plan of Work (Regional Forester, R-5). Results of project work undertaken with the aid of R-5 and R-6 Regional Office and field staff and cooperative work with research personnel of the California, Pacific Northwest, and Inter-Mountain Stations will be summarized by the following topics: (1) Disease and survey studies on the status of control. (2) Development of rust resistant white pines. (3) Testing of fungicides on pine and ribes. (4) Ecology of ribes in relation to control practices and sugar pine management. (5) Chemical methods for the control of ribes. A more detailed account of progress on these assignments is given in Sections II, III, and IV that follow this summary.

1. Disease Studies on the Status of Control.

Records from scouting, detailed checks of 3 one-acre status of control plots and laboratory identification of 559 rust samples collected from sugar pine areas of California and Oregon combined to show that 1955 was a poor year for intensification of rust on ribes in California and below average also in southern Oregon. There was no advance of rust on pine beyond previously located rust centers on the Stanislaus National Forest.

Status of control plots in southern Oregon and northern California that were checked in 1955 did not present any new or serious evidence of uncontrolled pine infection in the sites that these plots represented. Preliminary studies of sequential analysis indicate that this sampling technique may be useful for making a rapid and reliable classification of maintenance areas into categories of "further control needed" and "further control not needed." The buffer zone studies at Mill Creek, Oregon (20-chain protection strip) and at Goat Creek, Shasta County, California (10-chain protection strip) were maintained by reworking the ditch and skid roads at Mill Creek and by contract eradication of 30 acres (about half) of the Goat Creek plot. The latter work is noteworthy because it represents the first and a successful effort to suppress ribes to a virtual ribes-free condition by contract procedure.

Funds were made available this year for studies on the influence of microclimate (local climate) on the distance of spread and intensification of rust in sugar pine and western white pine forests in the Far West. Preliminary field work on this topic was started during the fall

months in northern California by the California Forest and Range Experiment Station under a contract arrangement between the Station and the University of California (Department of Plant Pathology). With exploratory objectives on this same study in mind, four hygrothermographs have been maintained for the past two years by the Pacific Northwest Station and the Rogue River National Forest in the South Umpqua and Rogue River areas. The Inter-Mountain Station has started a summary of literature and problem analysis of rust behavior. Also through cooperative effort of the California Station and the University of California (Department of Plant Pathology) an improvement of practical importance to rust survey work has been made by developing a more rapid technique for the identification of blister rust and pinyon rust. This method should be usable in the field. Studies on the rate of canker growth in sugar pine were continued by the Pacific Northwest and the California Stations.

2. Development of Rust Resistant White Pines.

Active search for white pines resistant to blister rust has been conducted in southern Oregon and northern California since 1949. Six sugar pine trees have been found in heavy rust centers of northern California that still rate the label of resistant trees. About a dozen western white pine trees at Bohemia Mt., Umpqua National Forest, that appear to have merit as breeding stock, are also under observation. A roguing test of sugar pine seedlings was initiated at Wind River Nursery in September, 1955 by mass inoculation with the rust. These seedlings were segregated into 28 lots according to origin of seed and represent the natural range of the species from San Diego County, California to Lane County, Oregon. From these roguing tests we hope to obtain resistant stock for future seed orchard development. Two test outplantings of resistant western white pine (grafts) from R-1 have been under observation--one at Mill Creek, Rogue River National Forest and one at Rhododendron, Oregon--since 1950. To date no infection has appeared on any of the resistant grafts while all of the companion control seedlings are heavily infected.

3. Testing of Fungicides on Pine and Ribes.

Experimental testing of fungicide (Fermate) for the direct protection of nursery stock was continued by the Pacific Northwest Station in cooperation with the Wind River Nursery, Timber Management, R-6, and this Unit. A portion of one bed of the 2-0 sugar pine stock under test with Fermate was inoculated this year with blister rust. At Bybee Creek on the Rogue River National Forest and at Wildcat Creek on the Plumas National Forest three fungicides (Fermate, Captan, and Acti-dione) were sprayed on ribes already infected with rust in the uredinial stage. While the fungicides caused a significant reduction of telia, there was no noteable systemic reaction. It is believed that these fungicides would not meet the requirements of practical control where rust is already established in the ribes leaf tissue. Acti-dione at 20 parts per million in aqueous solution was markedly phytotoxic on foliage of Ribes roezli and R. lobbi.

4. Ecology of Ribes, Control Methods, and Sugar Pine Management.

In cooperation with the Pacific Northwest Station ribes ecology studies for sugar pine management areas in southern Oregon were initiated in 1954 and maintained and augmented in 1955. Primary attention was given to the clear-cut-burn plantation method of sugar pine management. Ribes plots on the experimental sugar pine cuttings of the California Station in the Stanislaus National Forest were checked as were other ribes regeneration plots in control units in the central and northern Sierra Nevada. Analysis of records from several of these long-term ribes regeneration plots suggests that the ratio of current season live stem to total live stem may provide a useful index of the progress of control towards maintenance.

5. Chemical Methods for the Control of Ribes.

Results of 235 plot tests and observations on areas sprayed during the 1954 field season show: (1) Basal stem treatment of old-age and slow-growing Ribes roezli with low volumes of concentrated ester of 2,4-D and 2,4,5-T in oil gave more consistent and higher bush kill than the foliage sprays. This observation applies especially to the northern forests of the Sierra Nevada. (2) CMU (p-chlorophenyl dimethyl urea) applied to the soil can be made 100 per cent effective in killing all species of ribes, but the required practical lethal dosage is uneconomic at present prices of this weedkiller. (3) Dry pellets containing 2,4-D methyl ester are effective in killing young plants of a sensitive ribes such as R. roezli (i.e., useful on recent cut-over land) and also appear to hold promise for killing sprouts from old root crowns following fire or imperfect killing by previous chemical treatment. These pellets can be broadcast by hand from a simple canvas bag or dropped from fixed wing or rotary wing aircraft without danger to conifers 2 feet or more in height. During 1955 some 232 tests were made of new herbicides and new formulations of 2,4-D and 2,4,5-T. Amizol (3-amino 1,2,4-triazole), Kuron (a low volatile ester of 2,4,5-trichlorophenoxypropionic acid), and DB Granular (a dry free-flowing mixture of 2,4-D acid and disodium tetraborate) were the principal new toxicants tested. The latter compound is intended to kill the mature ribes and at the same time act as a soil sterilant to destroy duff-stored ribes seed.

SECTION II. RIBES ECOLOGY IN CALIFORNIA AND OREGON - 1955

By Clarence R. Quick, Forest Ecologist

Field studies on ecology of ribes in sugar pine stands of California and Oregon were continued during 1955 on the Sierra, Stanislaus, Tahoe, Plumas, Lassen, and Umpqua National Forests. The broad purpose of these studies is to provide a factual basis for most advantageous scheduling of ribes eradication work and for setting ribes control standards that are realistic, economic, and effective in protecting sugar pine from blister rust. The regeneration potential and rate of growth of ribes in white pine forests vary widely with changes of soil type, site quality, associated vegetation, and the degree and frequency of disturbance by fire, logging, windthrow, and animals. All of these factors markedly affect the number and longevity of ribes seeds stored in the forest floor, and these stored seeds largely determine the ultimate costs of permanent suppression of ribes on sugar pine management areas.

ECOLOGY STUDIES IN SOUTHERN OREGON DIRECTED TO EXPERIMENTAL CLEAR-CUT-BURN AREAS

In cooperation with the Pacific Northwest Forest and Range Experiment Station, a ribes-ecology field program was planned and initiated during 1954 on the South Umpqua Experimental Forest, about 20 miles northeast of Tiller, Umpqua National Forest, Oregon. Plots established in 1954 were rechecked, and additional studies were started in 1955. These studies have not been in progress long enough to justify further comments in this report. Brief description of the 1955 work on the Umpqua is contained in (BR-STUDIES-Ribes Ecology) "Second Progress Report on Ribes-Ecology Plots Established on and near the South Umpqua Experimental Forest, Oregon," typewritten report, September 30, 1955, 14 pages.

In California the long-range program of field work on ribes ecology was continued in accordance with the Regional Forester's Annual Plan of Work for 1955. Field trips with blister rust control supervisors on national forests and on control units of cooperating Federal, State, and private agencies were made to observe and discuss various ribes-ecology and chemical-eradication conditions and procedures.

BRUSH CUTTING WITHOUT SOIL DISTURBANCE DID NOT CAUSE RIBES INFLUX ON LASSEN PLOT

In 1940 four exclosure plots were established in the Sierra Nevada to study the effects of grazing on intensity and duration of ribes regeneration. Studies on three of these plots were completed last year, as noted in the 1954 annual report. Grazing tends to increase the vigor and duration of ribes regeneration, but in general these effects are unimportant because they are commonly masked by more potent ecological processes. The Lake Almanor exclosure plot, located about 5 chains east of section corner 18/17//19/20, T.27N., R.8E., Lassen National Forest, is being continued. In 1954 all brush stems were removed with hand tools, and cedar reproduction was thinned from selected portions of this plot to see if such treatment would cause an appreciable surge of ribes regeneration. Inspection of this plot in 1955 showed little ribes regeneration on the cleared portions. Brush and cedar reproduction were removed from two additional subplots in August, 1955. Studies of seedling regeneration of ribes and brush should be continued on cleared and uncleared subplots.

RATIO OF CURRENT TO TOTAL LIVE STEM A USEFUL INDEX OF ECOLOGIC VIGOR OF RIBES POPULATION

In order to follow the re-establishment of ribes populations subsequent to prescribed control work, 8 one-acre ribes regeneration plots, were established on blister rust control units during the period 1937-1940. The Blue Canyon plot near Shaver Lake, Sierra National Forest, was abandoned a few years after all trees on the plot had been killed in the Bretz Mill Burn of 1947. Studies on two or three other one-acre plots are nearing completion. Recent data from the Fanianni area one-acre plot (Sec. 12, T.27N., R.6E., Lassen National Forest) have been reported in Serial No. 153, "Ribes Regeneration on the Fanianni Area One-Acre Plot, 1948-1955," typewritten report, October 7, 1955, 12 pages. Results from the Rock Creek one-acre plot (Sec. 5, T.23N., R.9E., Plumas National Forest) likewise have been reported, in Serial No. 156, "Growth of Gooseberries and Currants on the Rock Creek One-Acre Plot, 1940-1953," typewritten report, November 23, 1955, 17 pages. Data from the Inter-Road one-acre plot (Sec. 3, T.22N., R.5E.) on Big Bar Mt. Ridge, Plumas National Forest, have been summarized in preparation for a report. Statistical analyses recently completed on ribes growth records collected from one-acre plots suggest that the ratio of current season live stem to total live stem may provide a practical index of ribes population vigor and of the progress of control towards maintenance.

Findings from the Shaver Lake one-acre plot (Sec. 13, T.10S., R.25E., Sierra National Forest) were summarized in the 1953 annual report. In September, 1954 some 340 gooseberry plants older than current season seedlings--a few fruiting--were eradicated from the 0.2 acre at the west end of the one-acre

(1 x 10 chains) plot. The west end of the plot was severely disturbed in logging. The relatively few ribes on the rest of the plot (0.8 acre) were not removed. The badly disturbed portion of this area, logged in 1941 after initial eradication of ribes under virgin timber in 1939, continues to produce many current season ribes seedlings each spring. Thus in June, 1955 about 400 new ribes seedlings appeared on the westerly 0.2 acre and about 240 on the rest (0.8 acre) of the plot.

PROPER TIMING OF RIBES ERADICATION REDUCES THE NUMBER OF WORKINGS NEEDED

The Cow Creek 1.6-acre plot (Sec. 34, T.5N., R.18E., Stanislaus National Forest) also continues to produce a fair number of ribes seedlings each year. This plot, established in 1930 near the peak of development of a very vigorous ribes population which followed severe logging disturbance in 1925, has produced many thousands of ribes seedlings over the 25 years since plot establishment. Timing of the initial ribes eradication with respect to logging is now known to have been improper. This, in conjunction with near complete logging disturbance--a major steam-donkey setting occurred on the plot--set up a very severe problem in ribes control. The record of recent production of current season ribes seedlings on the most active half-acre portion of the Cow Creek plot follows: 1950 - 120, 1951 - 100, 1952 - 85, 1953 - 190, 1954 - 160, and 1955 - 70. Not more than a third and perhaps only a sixth of these seedlings will survive and become established plants.

RIBES REGENERATION SLOWING DOWN ON C.F.&R.E.S. EXPERIMENTAL CUTTINGS ON STANISLAUS

The active regeneration of ribes just noted for the Shaver Lake and Cow Creek areas are in contrast to many other areas in sugar pine management units where proper timing of eradicative effort in relation to the ecologic development of the ribes population and better control of ground disturbance have resulted in much simpler and much shorter ribes regeneration problems.

The several ribes ecology plots on the 1948 and 1949 clear-cuts of the Stanislaus Experimental Forest, California Forest and Range Experiment Station, southeast of Pinecrest (Secs. 26-28, T.4N., R.18E., Stanislaus National Forest) were checked again this past summer. Ribes regeneration is slowing down rapidly on these areas. Data from the Landing #6 plot were reported in Serial No. 152, "Regeneration of Ribes and Other Vegetation, 1950-1954, on Landing #6 Clear-Cut, Stanislaus Experimental Forest," typewritten report, April 21, 1955, 12 pages.

SECOND CROP OF RIBES IS LOW AFTER FIRST CROP ON BURNED AREA HAS BEEN REMOVED

In August, 1936 a man-caused fire burned about 1.5 acres of the virgin-mature timber just southwest of the Cow Creek Guard Station, Stanislaus National Forest. A sizable and vigorous population of ribes promptly developed on the burn and was studied intensively for about a decade. The ribes were eradicated in 1947. Since 1947 the occurrence, persistence and growth of a much smaller and much less vigorous secondary population of ribes on the burned area have been studied. Total ribes live stem on seedling-origin plants resulting from the burn increased from 29 feet in 1927 to 3,240 feet in 1947, but only from 6 feet in 1950 to 15 feet in 1954 after ribes eradication in 1947. Two recent reports concerned with ribes on this burn have been prepared: (1) Serial No. 154, "Gooseberry Regeneration Following Fire in Virgin Timber," typewritten report, October 26, 1955, 16 pages and (2) Serial No. 155, "Statistical Analysis of Gooseberry Growth on a Burn in Mature Timber," typewritten report, November 2, 1955, 12 pages.

A few small cleared plots--"brush-off" plots--described in the 1953 and 1954 annual reports, from which all brush was removed by hand tools at time of plot initiation, are being checked annually. Contrary to expectations, no significant surge of ribes regeneration has occurred on the plot located on Big Bar Mt., Plumas National Forest, nor on the one east of Cow Creek Guard Station, Stanislaus National Forest. The 24-milacre plot on Chowchilla Mt., Sierra National Forest, denuded in June, 1953, produced an estimated 700 current season ribes seedlings in 1954, and 470 in 1955. In June, 1955 only 140 gooseberry plants older than current season seedlings could be found on the plot. Thus the one-year survival of 1954 current season seedlings was only 20 per cent.

In 1954 a small plot was established on a bulldozer disturbance along the old railroad grade road just east of Signal Peak Lookout, Chowchilla Mt., Sierra National Forest. Initiation of this plot and the general history of the area are described in the 1954 annual report. In 1954, 288 young gooseberries with a total of 860 feet of live stem were removed from the 3-milacre sample of disturbed area. Additional ribes regeneration from soil-stored seed was expected, but only one current season gooseberry seedling was found on the plot in June, 1955. The plot should be checked annually for a few years to see if additional seedling regeneration of the gooseberry occurs.

SECTION III. FURTHER DEVELOPMENT OF CHEMICAL-ERADICATION METHODS FOR CONTROL OF RIBES IN CALIFORNIA - 1955

By C. R. Quick, Forest Ecologist and W. S. Burrill, Agriculturist

232 NEW TESTS OF HERBICIDES EMPHASIZE PROBLEM RIBES TYPES

About the same number of herbicide tests on ribes were made in California during 1955 as in 1954. A total of 232 new plots was initiated. Chemical-eradication plots were established on three major areas, as follows: (1) Bald Mt. Plantation, Spring Gap Burn, northeast of Longbarn, Stanislaus National Forest, (2) Mooreville Ridge, northeast of Challenge, Plumas National Forest, and (3) an area near the Lost Creek highway maintenance station, east of Chester, Lassen National Forest. The Spring Gap Burn occurred in the early 1940's. On the area selected for the 1955 herbicide plots, the fire was followed promptly by a vigorous development of gooseberries and brush. Bear clover also is very common on the plot area. The Mooreville Ridge area was burned many years ago. The area selected for herbicide plots is heavily infested with old age, somewhat decadent gooseberries growing in brush and coniferous reproduction. This type of gooseberry, with a low ratio of leaves to stems because of age and slow growth, is very difficult to kill by treatment with herbicides applied as aqueous foliage sprays. The Lost Creek area was used for a few tests on one-year-old sprouts from previously treated gooseberries.

DIMETHYLUREA COMPOUNDS EFFECTIVE SOIL POISONS BUT NONSELECTIVE

The herbicidal derivatives of dimethylurea ("CMU," etc.), although more expensive than 2,4-D, show promise for use on ribes under some conditions. Eight additional tests with these materials were initiated during the past year. 2,4-D (2,4-dichlorophenoxyacetic acid), 2,4,5-T (2,4,5-trichlorophenoxyacetic acid), and MCP (2-methyl-4-chlorophenoxyacetic acid) are substituted acetic acids which have previously been tested rather thoroughly on many species, ages, and growth-forms of ribes. Comparably substituted propionic acids recently have been made available as herbicides, and several formulations of these propionic-acid materials were tested in 1955. Another new herbicide is Amizol (3-amino-1,2,4-triazole). This material was first tested on ribes in 1953. In 1955 about 25 tests involving Amizol, especially in combination with the propionic-acid herbicides, were initiated. The old standbys 2,4-D and 2,4,5-T were included in most 1955 series of tests as controls.

A series of 24 test plots treated with CMU, 3-(p-chlorophenyl)-1,1-dimethylurea, was started in 1952 on the Plumas National Forest near upper Fall River. The very slightly soluble chemical was applied on June 30 and on September 9 as wettable powder in aqueous spray and as broadcast pellets at rates of 8, 16, 32, 64, 128, and 256 pounds per acre. The lethal effect of CMU on gooseberries was somewhat slow in developing but has been progressive. Inspection of these plots on August, 1955 leads to the following conclusions: (1) The bush kill now, three years after treatment, is as good as or better than the kill after one year or after two years. (2) June treatments (77 per cent kill) are better than September treatments (54 per cent). (3) Wettable powder treatments applied in aqueous sprays (68.5 per cent) probably are better than broadcast pellets (62.5 per cent). All June applications of 128 and 256 pounds per acre and all September applications of 256 pounds per acre resulted in complete kill of all gooseberries on treated areas. Major objections to the general use of the substituted dimethylurea herbicides are: (1) cost and (2) lack of selectivity. In effective dosages they kill practically everything.

COMMERCIAL FORMULATIONS VARY AND MUST BE TESTED ON RIBES

Because unspecified emulsifiers and other additives are contained in liquid commercial herbicide, which chemical companies compound on a "secret formula" basis, most methods-development tests of herbicides are made with specific commercial or experimental formulations. We found in the past that the formulation of triethanolamine salt of 2,4-D, for example, of one chemical company gave significantly different results from that of another company. Thus chemical companies and specific trade-marked formulations perforce take on more importance than we should like. There appears to be no way of obviating this difficulty at present. Fortunately the formulations of about a half dozen of the most reliable manufacturers are roughly comparable in ease of use and in effectiveness.

OLD-AGE RIBES IN BRUSHY SITES DIFFICULT TO KILL BY FOLIAGE SPRAYS

Successful treatment of old-age, decadent, or brush-crowded Ribes roezli with herbicides in aqueous foliage sprays is difficult and uncertain. This is especially true in the northern portions of the range of the gooseberry. Last year sixty tests (32 in June and 28 in August) were put out on old, brush-crowded R. roezli on a plot area near the head of Pinchard Creek, Mooreville Ridge, Plumas National Forest. Included in this set of plots were tests with the mixed butoxyethanol esters of 2,4-D (2/3 of acid equivalent) and of 2,4,5-T (1/3 acid equivalent)--"Weedone Brush Killer 64"--without amendment and with additions separately of 4 different kinds of oils. Tests of 4 other brush-killer or high-emulsant formulations also were made.

Each material or combination was put out in June in 4 concentrations: 300, 500, 800, and 1,200 parts per million total acid equivalent. In August the concentrations were 600, 900, 1,200, and 1,500 parts per million total acid equivalent. The highest average bush kill in June (62 per cent), from applications of the 4 concentrations listed above, resulted from "Weedone Brush Killer 64" plus 1 per cent Diesel oil. The best individual test in June (83 per cent kill) resulted from treatment with the above-mentioned material at a total acid equivalent of 300 parts per million plus 1 per cent Diesel oil. The same material ("BK-64") at 600 parts per million plus 1 per cent Diesel oil gave the highest individual kill (50 per cent) in the August series of tests.

Aqueous foliage sprays applied in June and in August, 1954 to vigorous mature gooseberries on the 1945 Woods Ridge Burn, Stanislaus National Forest, were much more effective and consistent than comparable tests applied on the Plumas National Forest. In the June set of plots on Woods Ridge, sodium salt of 2,4-D was the basic ingredient. To water solutions of this salt were added separately 5 different spray amendment materials. Two liquid formulations("Weedone 638" and "Dow Kuron") also were tested in June. In June on Woods Ridge 2 or more tests out of a series of 4 concentrations (200, 300, 500, and 800 parts per million acid equivalent) of the following formulations or combinations gave perfect (100 per cent) bush kills: (1) sodium salt of 2,4-D with no additions (300 and 500 parts per million), (2) sodium salt of 2,4-D (300 and 800 parts per million) with added paint-pigment marker ("Titanox A-WD," 3 grams per gallon of spray), (3) sodium salt of 2,4-D (200 and 300 parts per million) plus 1 per cent cottonseed oil and emulsifier, (4) sodium salt of 2,4-D (500 and 800 parts per million) plus 1 per cent of an oily spray conditioner ("Multifilm L"), and (5) an "emulsifiable acid" formulation of 2,4-D ("Weedone 638") at 200, 300, and 800 parts per million. Also in June a commercial formulation of an ester of 2,4,5-T propionic acid ("Dow Kuron") killed all gooseberries to which applied (200, 300, 500, and 800 parts per million).

In August treatments, emphasis was placed on brush-killer formulations (mixed 2,4-D and 2,4,5-T) and similar liquid formulations. A relogging of white fir on parts of the Woods Ridge Burn during early summer of 1955 disturbed many of the plots started in August, 1954. The following tests of this summer series, however, resulted in perfect gooseberry kills: (1) sodium salt of 2,4-D (1,200 parts per million) plus 1 per cent "Multifilm L," (2) "Weedone Brush Killer 1,000" (500 parts per million), with no additions, (3) "Weedone Brush Killer 64" (500 parts per million) plus 1 per cent "Sovaspray 100," a so-called non-phytotoxic spray oil, and (4) an experimental high-emulsant ester formulation of 2,4-D only ("ACP-L-129") at 500 parts per million.

2,4-D PELLETS EFFECTIVE FOR KILLING YOUNG RIBES

The volatile methyl ester of 2,4-D contained in small dry pellets, when distributed evenly over small plots on Woods Ridge, effectively killed all 8-year-old gooseberries on the treated plots when applied at rates of 20 grams (0.70 oz.) to 35 grams (1.25 oz.) acid equivalent of 2,4-D per bush. Some treatments and retreatments of older gooseberries with 2,4-D pellets in other plot areas continue to show promise.

2,4-D AND 2,4,5-T ESTERS IN OIL AS BASAL STEM TREATMENTS BEST WAY TO KILL OLD-AGE RIBES

Basal-stem treatments of gooseberry bushes continue to be highly effective, in general much more effective and more consistent than aqueous foliage sprays on decadent or brush-crowded gooseberries. This is especially true in the northern portions of the range of Ribes roezli. The following table summarizes results from a series of basal-stem tests applied in August on the plot area on Mooreville Ridge where the August, 1954 foliage sprays resulted in an average bush kill of about 30 per cent.

PER CENT BUSH KILL FROM 1954 BASAL-STEM TESTS WITH 2,4-D AND 2,4,5-T ON RIBES ROEZLI MOOREVILLE RIDGE, PLUMAS NATIONAL FOREST

Chemical	All 2,4-D	Proportion of 2,4-D			All 2,4,5-T	Mean
		2/3	1/2	1/3		
Isopropyl esters*	91	100	71	100	79	90.1
Butoxyethanol esters**	71	100	86	94	95	90.2

* Standard Agricultural Chemicals, Incorporated, "Stantox P-44" and "Stantox T-45."

** American Chemical Paint Company, "ACP-L-290" and "ACP-L-533."

SECTION IV. DISEASE AND SURVEY STUDIES IN CALIFORNIA AND OREGON

By Douglas R. Miller, Pathologist

Scouting for White Pine Blister Rust - 1955.

1955 SEASON NOT FAVORABLE FOR RUST INTENSIFICATION ON RIBES

Scouting for white pine blister rust during the summer and fall of 1955 revealed that there was no long-distance spread of the disease, from aeciospores produced at northern sources, to ribes growing at the fringe of and beyond the known infection zone. Climatic conditions during the spring, when the aeciospores were being dispersed, did not appear to be favorable for more than a light catch of the rust on ribes. This was generally the case throughout the sugar pine belt. There were a few exceptions, particularly in some of the canyons which harbored pine infection centers. This was especially true on the Plumas and Tahoe National Forests. Only a small amount of any intensification of the rust on ribes occurred during the summer except at a few local areas. In many cases the leaves bearing the initial rust spots dropped from the bushes before weather conditions necessary for rust intensification had occurred. Telia, needed for rust identification, were generally scarce and often absent on the lightly infected bushes.

SPREAD OF BLISTER RUST AND PINYON RUST LIGHT

Infected ribes were confined generally to the immediate vicinity of cankerous pines. In only a few cases were the rusted ribes located at more than a few chains from sporulating cankers. As a result of this condition several new pine infection centers were located by first finding rusted bushes. The infected pine causing the rust on ribes were usually less than a chain away. Conditions necessary for the incidence of blister rust on ribes appeared to become less favorable as progress was made southward. For example, of 16 rust samples submitted from the Eldorado National Forest, only one was identified as being blister rust. This sample (from the Bear Loop infection center) was collected within a few feet of a sporulating canker; another rust sample taken within a few feet of the first infected bush was identified as pinyon rust. Another example is the Moore Creek infection center on the Stanislaus National Forest. A few more cankers were located here in the fall of 1955 and one rusted ribes was found nearby. The rust on this ribes was identified as pinyon rust. These are the two

known southernmost centers that bore sporulating cankers in 1955. These two examples indicate that even though a source of fresh spores was at hand, climatic conditions necessary for aeciospore germination, occurred for only a short period if at all while the aeciospores were still viable. Other former pine infection centers both inside and outside control unit boundaries on the Eldorado National Forest were re-examined but no new infection caused by blister rust was found on either host.

Pinyon rust on ribes was exceedingly light in 1955. No samples of this rust species were found north of the Lassen National Forest nor were any found in the Coast Range. Pinyon rust made its greatest spread on the Stanislaus National Forest, but even there it was light when compared to its spread during most years.

Rust samples were collected from nearly every area where rusted ribes bearing telia were found. The results of these determinations are presented in the following tabulation:

NUMBER OF RUST SAMPLES SUBMITTED AND THE
RESULTS OF THE IDENTIFICATION TESTS

Area	Identification of Rust Sample			
	Blister Rust	Pinyon Rust	Indefinite	Total
Gifford Pinchot	2	-	-	2
Rogue River	26	-	1	27
Modoc	5	-	-	5
Shasta-Trinity	64	-	-	64
Mendocino	19	-	-	19
Lassen	49	7	-	56
Lassen Volcanic N. P.	8	3	-	11
Plumas	44	2	2	48
Tahoe	98*	19*	1	116*
Eldorado	1	15	-	16
Stanislaus	1**	142	-	143
Toiyabe	-	1	-	1
Yosemite N. P.	-	39	1	40
Sierra	-	13	-	13
Total	317*	241*	5	561*

* Two samples had both blister rust and pinyon rust present. These two specimens were recorded both as blister rust and pinyon rust but only as two samples in the number submitted. This accounts for the discrepancy between the columns and their totals.

** As this determination does not follow the pattern of infection, there is considerable doubt as to its being blister rust.

45 NEW PINE INFECTION CENTERS FOUND ON TAHOE

Several new pine infection centers were located within the rust zone but none was found south of the previously established line of spread. A three-man crew working on the Tahoe National Forest spent much of their time scouting for blister rust. As a result about 45 heretofore unknown pine infection centers were located. These ranged in size from a single tree for many of the centers to about 200 acres for the Empire Creek center. About 30 of these centers had 5 or less infected trees and only 9 had more than 15 infected trees. Many of these centers had originated in 1944 and two are believed to be of 1941 origin or older. An analysis of these centers further illustrates that on those occasional local areas where conditions necessary for rust development are highly favorable, a rapid build-up of the rust on pine occurs, and where these conditions are not favorable the build-up on pine is very slow.

About 10 pine infection centers were discovered on the Plumas National Forest and none was reported from the Eldorado National Forest. Although less time was spent scouting for the rust on these two forests than was spent on the Tahoe National Forest, enough time was spent to indicate that the rust may be less prevalent.

Disease Survey Work - 1955.

SEARCH FOR RUST RESISTANT WHITE PINES CONTINUED

The search for rust-resistant western white and sugar pines was continued throughout 1955. Trees at several areas were examined, but none were found that fit all the qualifications of being resistant to blister rust. However, two more were found at the Supan Road infection center (in the vicinity of three known resistant trees growing there) which will be kept under observation until such time as they are determined to be resistant or nonresistant. Scion material from two of the resistant trees at this area was collected during the first part of May for some exploratory tests of grafting on 2-0 seedling stock.

MASS INOCULATION OF SUGAR PINE SEEDLINGS AT WIND RIVER NURSERY

The cooperative work on the development of rust-resistant white pines being conducted by the U. S. Forest Service (R-5, R-6, Pacific Northwest and California Forest and Range Experiment Stations, and the BRC Methods Development Unit) was continued during 1955. The sugar pine seed collected in 1954 from 28 areas scattered throughout the commercial range (from San Diego County, California to Lane County, Oregon) were planted at the Wind River Forest Nursery near Carson, Washington. These collections were made (1) to determine whether there was any indication of difference in susceptibility to blister rust of the seedlings from the various seed lots and (2) to speed the acquisition of rust-resistant sugar pine for planting and breeding stock. The sugar pine seedlings were subjected to artificial inoculation during the period of September 13-21.

The techniques of inoculation were essentially the same as those developed by J. W. Kimmey, R. T. Bingham, and C. D. Leaphart from 1952 to 1954. Each inoculation test was conducted for a period of about 72 hours. Spore casts taken systematically by T. W. Childs during each run showed ample viable sporidia in the first run and probably sufficient inoculum in the second run to give good infection results. Relative humidity and temperature conditions were maintained at levels favorable for spore germination. These seedlings will be subjected to another inoculation in the fall of 1956. Outplanting of any resistant appearing seedlings will probably be in southern Oregon in two or three years.

NO CANKERS ON GRAFT SELECTIONS OF RESISTANT WESTERN WHITE PINE

The Rogue River National Forest outplanting (beside Mill Creek in the vicinity of Prospect, Oregon) of rust-resistant selections (grafts) and control seedlings of western white pine furnished by R-1 in 1951 was inspected again on July 18, 1955. Of the original 12 resistant grafts and 36 controls outplanted in a modified block design, 5 grafts survived transplanting and none of these is infected. Seventeen of the original 36 controls survived transplanting. These 17 were alive at the time of examination, but all were infected with blister rust. Some were so badly damaged that their needles were beginning to fade. In addition to the 17 surviving controls there were 7 young volunteer white pines of the same species on the ground when the plot was established. All of the volunteers were infected. The 17 controls and 7 volunteers had a total of 138 visible cankers (39 of which had already reached the bole of the tree) at the time of examination. Two replacement grafts survived the winter and are now growing in their respective places in the plot.

FERMATE, CAPTAN, AND ACTIDIONE TESTED AS FUNGICIDES

A search was started to find a fungicide of practical value that would inhibit blister rust development on the leaves of ribes bushes. This work was undertaken (1) to answer questions received at the Washington and Regional Offices of the U. S. Forest Service about the possibilities of treating horticultural groups of ribes bushes with a fungicide instead of eradicating them and (2) to serve the interests of the control work in the Far West. In some areas where currants and gooseberries are grown as a fruit crop, heavy infection by the rust has seriously reduced both quantity and quality of the berries. In the actual control program, fungicides that would prevent rust development on either pines or ribes might be used for nursery protection and in short-term protection of young pines on recent cut-over areas or on plantations in clear-cut and burn areas. Fermate, Captan and Actidione were chosen for preliminary field tests which were made on infected ribes growing under natural conditions near the Wildcat Creek infection center on the Plumas National Forest, California, and beside the Bybee Creek road on the Rogue River National Forest, Oregon. The former tests were made on Ribes roezli, the latter on R. lobbi. Although all fungicides suppressed telia formation markedly, some new uredia developed. Because of the apparent need for thorough coverage of all foliage, the three fungicides tested do not appear to be of practical value for control.

CONTRACT RIBES ERADICATION SATISFACTORY FOR RIGID STANDARDS OF DISEASE STUDY PLOT

Some ribes eradication work was done at the Goat Creek disease survey plot. A contract was let for 13 acres in June. This was worked to a standard of "Not more than one foot of live stem could be left per acre and no bush having more than two inches of live stem could be left." In late August 17 acres more of the 64.4-acre plot was contracted. Since a portion of this area had the timber removed in 1953-1954 and since a fair number of ribes seedlings had come in after the logging, the standard of work was made a little less rigid. The live stem standard was made the same as in the first contract but the maximum size of bush that could be left was changed from 2 to 4 inches. Both of these are very rigid standards but since this is a study plot we want to be sure that any new cankers that start on the pine are caused from ribes growing outside the plot and not from bushes left inside the plot. To be sure of the thoroughness of the work a check of from 25 to 50 per cent of the area was made instead of the usual 5 to 10 per cent.

Three of the one-acre disease survey plots were examined for ribes and pine infection. All three plots had been established in 1950 for studies on the status of control, and this was the first time the sugar pine had been checked for infection. The Spring Garden plot on the Plumas National Forest

is now outside control unit boundaries but is being maintained as long as any value can be derived from it. A total of 67 ribes, of which 38 were current year seedlings, was found on this plot. These bushes had 51 feet of live stem. Although a few cankers had been removed when the plot was established, none was found in 1955.

A check of the Mayflower Ranch plot on the Klamath National Forest showed 3 ribes with 36.4 feet of live stem. Four cankers had originated since the plot was established. The Squaw Creek Way plot on the Siskiyou National Forest was free of ribes when established, and none was found at the 1955 examination. There were 13 new cankers (of 1950 origin or younger) found on the plot when examined in July, 1955. A summary of the pine infection data by plot that was collected this year appears in the following tabulation:

SUMMARY OF THE 1955 DISEASE SURVEY PINE INFECTION DATA*

State	Forest	Name of Plot	Acres in Plot	Tree Data			Canker Origin		
				Infected	Not Infected	Total	Pre-1950	1950 And Later	Total
California	Plumas	Spring Garden	1.0	-	186	186	-	-	-
	Klamath	Mayflower Ranch	1.0	15	38	53	14	4	18
Subtotal			2.0	15	224	249	14	4	18
Oregon	Siskiyou	Squaw Creek Way	1.0	47	436	483	84	13	97
Total All Plots			3.0	62	660	722	98	17	115

* All data recorded in code and transferred to punch cards for summarization on the International Business Machines.

Region 6

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

BR
REPORTS
Annual, 1955
(Pacific Northwest Region)

Portland, Oregon

ANNUAL REPORT OF BLISTER RUST CONTROL

IN THE PACIFIC NORTHWEST REGION

1955

By: C. P. Wessela
Agriculturist

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Portland, Oregon
February 29, 1956

SUMMARY - 1955

AGENCIES COOPERATING

As in past years, ribes eradication to control the white pine blister rust disease in Oregon and Washington was done solely by federal agencies to protect five-needled pine on federal lands. Three agencies, the U. S. Forest Service, the National Park Service, and the Bureau of Land Management each conducted control programs. The Oregon State Board of Forestry and the State of Oregon Department of Agriculture again participated cooperatively by enforcing quarantine regulations, inspecting horticultural nurseries and by helping in surveys and sugar pine regeneration problems. Following the national pattern established by the Lea Act enacted in 1940 by the Congress, the Forest Service provided leadership, technical direction and coordination for work done by other federal and state agencies.

ACCOMPLISHMENTS

Ribes Eradication. The 1955 project was adequate to cope with the disease on those areas presently selected for protection. Schedules were met, and, as a whole, control kept pace with the rapidly changing forest conditions caused by an accelerated cutting and planting program. The following tabulation shows accomplishments by operating agency for calendar year 1955:

Operating Agency	Acres Treated			Man Days Expended	Ribes Destroyed
	Initial Work	Re-erad. Work	Total		
Forest Service	1,700	4,462	6,162 1/	1,555	148,837
BLM	1,488	24,901	26,389 2/	1,177	59,714
Park Service	- - -	639	639	316	16,501
Total	3,188	30,002	33,190	3,048	225,052

1/ Includes 906 acres examined and found to be ribes free.
2/ Includes 24,420 acres examined and found to be ribes free.

With the exception of 378 acres covered in re-eradication work in Mt. Rainier National Park in Washington all control work was confined to southern Oregon sugar and western white pine bearing lands. Costs averaged $3.38 per acre.

Methods Development. Aerial photographs were used for the first time to locate ribes sites in connection with advance checking work on the Umpqua National Forest. Results are not conclusive, but for locating ribes sites in densely stocked timber stands the method holds promise of reducing costs and increasing efficiency.

The Methods and Development Unit of Region 5 continued ribes ecology plot studies on clearcut areas in the South Umpqua drainage. In addition this Unit initiated investigations on the use of fungicides to prevent blister rust infection on ribes leaves or to render infection already on them impotent.

Studies have been started to determine on what sites sugar pine will produce more volume and quality than other species. In connection with restocking clearcuts by planting in southern Oregon, resource managers are often at a loss as to what species to plant. The current study is designed to assist them in that decision wherever sugar pine is considered as a planting possibility despite the handicap of blister rust. This study was made possible through the leadership, cooperation, and assistance of the Siskiyou-Cascade Research Center.

Work was continued on the development of sugar pine stock resistant to blister rust infection. Seedlings grown from seed collected from twenty-eight different localities throughout the sugar pine region were inoculated with blister rust artificially. The purpose of this study is to learn whether resistance varies with locality, and if resistance is exhibited by any seedlings from a particular locality to use them and the locality for the production of additional resistant stock.

RESEARCH UNDERWAY

Canker growth rate studies on southern Oregon sugar pine were continued. An experiment designed to determine the effectiveness of fungicides as a protective measure for five-needled pine stock grown in nurseries was concluded insofar as the application of fungicides is concerned.

STATUS OF CONTROL

As of December 31, 1955, a total of 177,745 acres were contained in blister rust control units in Oregon and Washington. All but 7,008 acres had received an initial working and 65,898 acres, or 37 percent, were classed as being in a state of maintenance. Area requiring re-eradication work totaled 104,839 acres.

RECOMMENDATIONS

In Oregon about 66,000 acres, or 37 percent, of all control area is now classed as being on maintenance. Needing study is how often and how to organize and conduct inexpensive examinations of this area on maintenance to determine the status of control.

The whole concept of maintenance needs review to more clearly define what the term means and how that condition is attained and maintained.

The resistant pine development program should be stepped up and set on a firmer base in Oregon and Washington.

TABLE I

STATUS OF RIBES ERADICATION BY OPERATING AGENCY

AND LAND OWNERSHIP IN THE PACIFIC NORTHWEST REGION

AS OF DECEMBER 31, 1955

Control Operation	Land Ownership	Acres Control Area: In White Pine Mgt Units	Acres Control Area: In Protection Zone	Acres Control Area: In Control Unit	Acres Worked Initially	Required Future Work: Initial Acres	Required Future Work: Re-erad Acres	Required Future Work: Maint. Work Acres
FOREST SERVICE								
Umpqua	Nat.For.	8,560	- -	8,560	6,627	1,933	5,644	983
	Contro.	2,375	- -	2,375	620	1,755	620	- -
	Total	10,935	- -	10,935	7,247	3,688	6,264	983
Rogue River	Nat.For.	57,175	150	57,325	56,802	523	43,752	13,050
	Private	- -	2,934	2,934	2,774	160	2,774	- -
	Total	57,175	3,084	60,259	59,576	683	46,526	13,050
Total Forest Service	Nat.For.	65,735	150	65,885	63,429	2,456	49,396	14,033
	Contro.	2,375	- -	2,375	620	1,755	620	- -
	Private	- -	2,934	2,934	2,774	160	2,774	- -
	Total	68,110	3,084	71,194	66,823	4,371	52,790	14,033
BUREAU OF LAND MANAGEMENT								
Medford District	O&C	49,105	2,605	51,710	50,720	990	26,524	24,196
	P. Dom.	1,463	254	1,717	1,677	40	467	1,210
	Nat.For.	26,112	1,634	27,746	27,356	390	13,851	13,505
	Contro.	1,240	- -	1,240	1,240	- -	1,240	- -
	Private	- -	15,369	15,369	14,152	1,217	8,410	5,742
	State	- -	637	637	637	- -	637	- -
	Total	77,920	20,499	98,419	95,782	2,637	51,129	44,653
NATIONAL PARK SERVICE								
Crater Lake	N.P.S.	3,632	- -	3,632	3,632	- -	- -	3,632
*Mt. Rainier	N.P.S.	4,500	- -	4,500	4,500	- -	920	3,580
	Total	8,132	- -	8,132	8,132	- -	920	7,212
ALL AGENCIES								
Regional Totals	O&C	49,105	2,605	51,710	50,720	990	26,524	24,196
	P. Dom.	1,463	254	1,717	1,677	40	467	1,210
	Sub.Tot.	50,568	2,859	53,427	52,397	1,030	26,991	25,406
	Nat.For.	91,847	1,784	93,631	90,785	2,846	63,247	27,538
	Contro.	3,615	- -	3,615	1,860	1,755	1,860	- -
	Sub.Tot.	95,462	1,784	97,246	92,645	4,601	65,107	27,538
	N.P.S.	8,132	- -	8,132	8,132	- -	920	7,212
	Tot.Fed.	154,162	4,643	158,805	153,174	5,631	93,018	60,156
	Private	- -	18,303	18,303	16,926	1,377	11,184	5,742
	State	- -	637	637	637	- -	637	- -
	G.Total	154,162	23,583	177,745	170,737	7,008	104,839	65,898

*In State of Washington

TABLE 2

1/ SUMMARY OF RIBES ERADICATION BY ALL AGENCIES

PACIFIC NORTHWEST REGION -- 1955

Control Operation	Class of Work	Land Ownership	Acres Worked	Acres Checked & Meeting Standards: Without Work	Acres Total	Total Man Days	Ribes Destroyed
		Nat.For.	699	906	1,605	394	38,271
		Contro.	95	- -	95	19	2,852
	Initial	O&C	337	760	1,097	144	3,153
		Private	231	160	391	105	3,360
		Total	1,362	1,826	3,188	662	47,636
		Nat.For.	3,342	13,524	16,866	1,431	104,914
		Contro.	130	82	212	33	3,380
	Re-erad	Nat.Park	428	211	639	316	16,501
All		O&C	989	10,866	11,855	526	43,388
		Private	221	209	430	80	9,233
		Total	5,110	24,892	30,002	2,386	177,416
		Nat.For.	4,041	14,430	18,471	1,825	143,185
		Contro.	225	82	307	52	6,232
	All	Nat.Park	428	211	639	316	16,501
		O&C	1,326	11,626	12,952	670	46,541
		Private	452	369	821	185	12,593
		Total	6,472	26,718	33,190	3,048	225,052

1/ All ribes eradication work was done in Oregon except that done in Mt. Rainier National Park in State of Washington. (See National Park Summary, Table 5 for details.)

TABLE 3

SUMMARY OF RIBES ERADICATION BY THE FOREST SERVICE

PACIFIC NORTHWEST REGION - 1955

Control Operation	Class of Work	Land Ownership	Acres Worked	Acres Checked & Meeting Standards Without Work	Acres Total	Total Man Days	Ribes Destroyed
Umpqua National Forest (Oregon)	Initial	Nat.For.	632	906	1,538	368	37,941
		Contro.	95	- -	95	19	2,852
		Total	727	906	1,633	387	40,793
	Re-erad	Nat.For.	356	288	644	64	1,010
		Contro.	130	82	212	33	3,380
		Total	486	370	856	97	4,390
	All	Nat.For.	988	1,194	2,182	432	38,951
		Contro.	225	82	307	52	6,232
		Total	1,213	1,276	2,489	484	45,183
Rogue River National Forest (Oregon)	Initial	Nat.For.	57	- -	57	22	237
		Private	10	- -	10	8	100
		Total	67	- -	67	30	337
	Re-erad	Nat.For.	2,795	811	3,606	1,041	103,317
	All	Nat.For.	2,852	811	3,663	1,063	103,554
		Private	10	- -	10	8	100
		Total	2,862	811	3,673	1,071	103,654
Totals	Initial	Nat.For.	689	906	1,595	390	38,178
		Contro.	95	- -	95	19	2,852
		Private	10	- -	10	8	100
		Total	794	906	1,700	417	41,130
	Re-erad	Nat.For.	3,151	1,099	4,250	1,105	104,327
		Contro.	130	82	212	33	3,380
		Total	3,281	1,181	4,462	1,138	107,707
	All	Nat.For.	3,840	2,005	5,845	1,495	142,505
		Contro.	225	82	307	52	6,232
		Private	10	- -	10	8	100
		Total	4,075	2,087	6,162	1,555	148,837

TABLE 4

SUMMARY OF RIBES ERADICATION BY THE BUREAU OF LAND MANAGEMENT

PACIFIC NORTHWEST REGION - 1955

Control Operation	Class of Work	Land Ownership	Acres Worked	Acres Checked & Meeting Standards Without Work	Acres Total	Total Man Days	Ribes Destroyed
Medford District (Oregon)	Initial	Nat.For	10	--	10	4	93
		O&C	337	760	1,097	144	3,153
		Private	221	160	381	97	3,260
		Total	568	920	1,488	245	6,506
	Re-erad	Nat.For	191	12,425	12,616	326	587
		O&C	989	10,866	11,855	526	43,388
		Private	221	209	430	80	9,233
		Total	1,401	23,500	24,901	932	53,208
	Total	Nat.For	201	12,425	12,626	330	680
		O&C	1,326	11,626	12,952	670	46,541
		Private	442	369	811	177	12,493
		Total	1,969	24,420	26,389	1,177	59,714

TABLE 5

SUMMARY OF RIBES ERADICATION BY THE NATIONAL PARK SERVICE

PACIFIC NORTHWEST REGION - 1955

Control Operation	Class of Work	Land Ownership	Acres Worked	Acres Checked & Meeting Standards Without Work	Acres Total	Total Man Days	Ribes Destroyed
Crater Lake (Oregon)	Re-erad	Nat.Park	50	211	261	3	317
Mt. Rainier (Wash.)	Re-erad	Nat.Park	378	--	378	313	16,184
	Total	Nat.Park	428	211	639	316	16,501

TABLE 6

SUMMARY OF ERADICATION BY CONTRACT

PACIFIC NORTHWEST REGION - 1955

Control Operation	Agency	Acres Worked by Contractor	Man Days	Thousands of Ribes Destroyed	Average Price Per Acre Paid to Contractor
ALL WORKINGS (INITIAL AND RE-ERADICATION)					
Umpqua	FS	--	--	--	--
Rogue River	FS	1,309	369	59	$ 5.44
Total	FS	1,309	369	59	5.44
Medford	BLM	1,503	442	59	7.36
Total 1955	All	2,812	811	118	6.46
Accumulative Totals 1946 - 1955		51,894	14,596	1,201	$ 4.94

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REPORTS
Annual, 1955
(Pacific Northwest Region)

U. S. FOREST SERVICE PROGRAM

STATUS OF CONTROL

National forest land receiving protection on the Rogue River, Umpqua, and Siskiyou National Forests in southern Oregon totals 93,641 acres as of December 31, 1955. In addition 3,615 acres of controverted land is being protected and 2,934 acres of privately-owned land is treated to protect adjoining national forest holdings. Control area which has not been worked initially totals 4,761 acres, 77 percent of which is on the Umpqua National Forest. Area classed as being on maintenance is 27,538 acres or 27 percent of all control area. Trends indicated a gradual reduction in the amount of control work required on the Rogue River and Siskiyou with a compensating increase occurring on the Umpqua where control area is being added through planting and seedspotting.

ORGANIZATION AND ADMINISTRATION OF 1955 WORK

Rogue River: One man from the supervisor's staff working under the general direction of the District Ranger was responsible for all phases of control work on the forest. In addition he fulfilled leadership, technical direction and coordination responsibilities for control work done by other federal agencies whose control area lies within the zone of influence of the Rogue River National Forest.

Ribes eradication, checking and disease surveys were conducted with 17 men and seven contracting firms. The hired men were quartered at the multiproject camp located near Union Creek Ranger Station. Men from this camp were also used to do checking work on other districts and through cooperative agreements on Bureau of Land Management and Park Service work near the forest

Umpqua: All 1955 control work was again confined to the South Umpqua Ranger District where a crew of four to five men were employed for about two and one-half months. No separate blister rust control camp was established since it was possible and advantages to quarter the crew at Tiller Ranger Station facilities.

General project direction through the District Ranger was provided by a staffman from the supervisor's office. Services and supplies were functions of the South Umpqua Ranger District.

Siskiyou: Work on national forest land on this forest was financed and administered by the Bureau of Land Management. The organization and administration of this project is described in the accompanying report covering that agency's blister rust control activities.

ACCOMPLISHMENTS

Rogue River: Nearly all of the 3,673 acres treated were adjacent to or in recent five-needled pine plantings. The balance was in areas of high pine values as determined by the recent pine inventory completed on blister rust

control area. A total of 1,071 man days were expanded by force account crews and contracting firms and 103,600 ribes were destroyed. Post and regular checks were conducted on 6,400 acres in the Union Creek District on the Forest Service project, on 4,210 acres on the Bureau of Land Management project, and on 261 acres in Crater Lake National Park. In addition, infected branches were pruned from 9,600 young sugar pine trees and a start was made toward establishing a series of permanent plots throughout control units to be examined at four to six year intervals to determine control status.

A new unit of 450 acres was established on the Butte Falls District through detailed pine inventories and advance ribes checking.

Good progress was made toward coordinating blister rust control activities with cutting and planting activities. This year, twenty-five clearcuts totalling 440 acres were planted to sugar pine. This brings the total area on the Rogue River planted to five-needled pine to approximately 850 acres.

Umpqua: Except for a small amount of work on the South Umpqua Experimental Forest and on the Quartz Creek Unit, all ribes eradication work was confined to or adjacent to clearcuts in the vicinity of Zinc Creek and Junction Springs which have been seedspotted to sugar pine. With an expenditure of 484 man days, 45,000 ribes were destroyed in working 2,489 acres.

To facilitate administration and strengthen the degree of control established, the South Umpqua Experimental Forest and most of the clearcuts which are being seedspotted to sugar pine in the Meridian sale area to the west were combined in one control unit. In addition, the control area in the Experimental Forest was enlarged and the Quartz Creek Unit was rounded out to natural topographic features to bring the total control area on the Umpqua to 10,935 acres.

For the first time aerial photographs were used in performing the advance check on the Meridian sale area. Eight cutting units to be planted to sugar pine are scattered through an area of dense timber. Ribes growth under the dense canopy in this area is practically nonexistent; however, scattered through it are small openings and cliffs where ribes do grow. The problem is to locate these ribes sites. In this instance, aerial photographs were used to plot all openings and other likely ribes sites on a large scale map. All of these suspected ribes sites were then examined carefully on the ground and classified as to ribes populations. Area covered by dense timber as determined by the photographs and observations from the ground will not be given further eradicative treatment until the crown canopy is disturbed. This method of advance checking shows promise of reducing costs on portions of the South Umpqua drainage.

Coordination of cutting and planting with blister rust control activities is progressing satisfactorily since the blister rust staffman also coordinates planting over the entire forest. This year about 250 acres were seedspotted to sugar pine.

Siskiyou: Accomplishments on national forest land on the Siskiyou are covered in the accompanying Bureau of Land Management report of blister rust control activities.

WORK PLANNED FOR 1956

Rogue River: Contracting of ribes eradication will be stepped up and work by force account crews decreased proportionately. About 4,000 acres needs treatment, about one-fourth of which will be done by a force account crew of nine men. The remaining 3,000 acres located principally in the vicinity of Jim and Sunshine Creeks will be contracted. To perform the necessary checking work in connection the contract and force account program, six checkers will be employed. They will also be used to do checking work for the Bureau of Land Management on a reimbursable basis.

Umpqua: To protect areas seedspotted to sugar pine and areas carrying good stands of natural reproduction, about 1,200 acres need to be worked. Plans call for contracting about one-half of the work with the remainder to be done by a force account crew of three laborers and one foreman. One checker will also be employed to check contract work and advance check areas scheduled for treatment in 1957.

A multipurpose work camp will be constructed at South Umpqua Falls to relieve congestion at Tiller and locate crews closer to their work.

Siskiyou: As a result of the land exchange now in progress between the Forest Service and the Bureau of Land Management, and status of control, no work on national forest land is planned in 1956.

BR
REPORTS
Annual, 1955
(Pacific Northwest Region)

BUREAU OF LAND MANAGEMENT PROGRAM

STATUS OF CONTROL

The Bureau of Land Management has for the last several years through cooperative arrangements assumed responsibility for conducting required control work on 98,419 acres of mixed ownership principally in or adjacent to the Siskiyou National Forest. Oregon and California reverted land grants total 51,710 acres, public domain 1,717 acres, national forest 27,746 acres, controverted 1,210 acres, private 15,369 acres and state land 637 acres. Private land included is treated in protection zones established to prevent damage to federal holdings.

Initial work has been completed on 97.3 percent of total area in control units and 47 percent of area which has received treatment is classed as being on maintenance. Re-eradication work remaining totals 51,129 acres. Maintenance acreage will increase rapidly as re-eradication work is done.

ORGANIZATION AND ADMINISTRATION OF 1955 WORK

Project supervision was provided by a Bureau of Land Management superintendent attached to the Medford District Forester's staff. Until June 30, technical direction and leadership was furnished by the Forest Service through a staffman attached to the Umpqua National Forest Supervisor's staff After July 1, these functions were provided from the Forest Service Regional Office Timber Management staff in Portland, Oregon. Through a special reimbursement arrangement the Siskiyou National Forest headquarters hired and payrolled temporary personnel and purchased supplies.

A temporary camp was constructed at Hanson Saddle in the Bunker Hill Mine Unit west of Galice, Oregon. This served as a base of operations for a crew which averaged 12 in number throughout most of the season. Contract checking on the Hungry Hill Unit was done with this crew. Checking of contract work on the Evans Creek and Beaver Creek Units was done on a reimbursable basis by Forest Service checkers from the Rogue River National Forest

Because of adequate allotments of control funds and the checkerboard pattern in which national forest land and O&C grant lands lie on the Siskiyou National Forest, the Bureau of Land Management has financed control work on all federal land since 1940. This policy was continued through 1955. Other financing arrangements will likely result when consolidation of holdings is effected through the pending land exchange between the Forest Service and the Bureau of Land Management.

ACCOMPLISHMENTS

Most 1955 work was confined to the Bunker Hill-Chrome Ridge-Peavine Units west of Galice, Oregon, and consisted primarily of a thorough post-check of area worked in these units in previous years. All ribes eradication on the Hungry Hill, Evans Creek and Beaver Creek Units was done by the contract method.

A total of 26,389 acres were covered with an expenditure of 1,177 man days. Of the 26,389 acres covered, 24,420 acres were found to be ribes free. As a result over 19,000 acres were placed on maintenance.

WORK PLANNED FOR 1956

Work in 1956 will be concentrated in the Trapper's Cabin Unit which was worked initially in 1950-51-52. Plans have been made to place an eight or nine man crew in a camp in the unit to give it a complete post-check. Most areas found to be ribes free will be placed on maintenance; areas supporting ribes regeneration will either be worked with the checkers or contracted. About 20,000 acres will be treated by the various methods of coverage.

Plantations in the Beaver Creek Unit will be post-checked late in the 1956 season. No work is required on the Evans Creek plantation.

During 1954 and 1955, the Forest Service through cooperative arrangement hired and payrolled all temporary personnel employed on the Bureau of Land Management project. In 1956, the Bureau of Land Management plans to hire and payroll all employees through their own facilities.

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REPORTS
Annual, 1955
(Pacific Northwest Region)

NATIONAL PARK PROGRAM

STATUS OF CONTROL

National park land in control units totals 8,132 acres, 4,500 acres of which is in Mt. Rainier National Park and the remaining 3,632 acres in Crater Lake National Park. At Crater Lake all area is now classed as on maintenance; at Mt. Rainier 3,580 acres are considered as being in a maintenance status.

ORGANIZATION AND ADMINISTRATION

Crater Lake: By means of a cooperative agreement, necessary re-eradication work at Crater Lake was done by Forest Service employees from the Rogue River National Forest.

Mt. Rainier: From late June to early September a crew of seven eradicators and a foreman subsisted themselves in buildings near the White River entrance. In addition, one checker was employed who worked part time on the White River Unit and part time on the Silver Forest Unit on the Longmire side of the park. Leadership and technical direction were provided by the Forest Service from the Regional Office at Portland, Oregon; supervision and administration were park staff responsibilities.

ACCOMPLISHMENTS

Crater Lake: Ribes eradication and checking work was done on a total of 261 acres. Ribes were found to be suppressed to extremely low population levels since only 317 of them were found. As a result, the entire Cloud Cap Unit can now be classed as being on maintenance.

Mt. Rainier: The re-eradication job started on the White River Unit in 1954 was completed as a result of 1955 work. A total of 378 acres were covered resulting in the removal of 16,184 ribes. In addition, the entire Silver Forest Unit was given a thorough post-check.

At a field meeting of Forest Service and Park Service representatives agreement was reached that ribes eradication in the White River Unit had accomplished the original objective of deferring extensive rust damage for a considerable length of time, but that additional work would accomplish little. Hence it was agreed that no more control work would be done on the White River Unit. At the same meeting, it was also decided not to do more ribes eradication on other Mt. Rainier control area until a disease survey had been conducted over it to assess the effectiveness of protective work done thus far.

WORK PLANNED FOR 1956

Crater Lake: No control work is necessary for 1956 or for several years to come. Examinations to determine effectiveness of control should be made at four to six year intervals.

Mt. Rainier: As a result of the decisions described under ACCOMPLISHMENTS no ribes eradication work is planned in Mt. Rainier during 1956; however, two men will be employed and quartered at Longmire to perform a thorough disease survey on the Silver Forest and Longmire Units. Analysis of data collected on this survey will form the basis for deciding whether or not control work will be continued in subsequent years on these units.

Regions 7 and 8

WHITE PINE BLISTER RUST CONTROL

REGIONS SEVEN and EIGHT

CALENDAR YEAR 1955

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

WHITE PINE BLISTER RUST CONTROL IN THE EASTERN REGION

ANNUAL REPORT FOR 1955

United States Department of Agriculture

FOREST SERVICE

Region 7 Upper Darby, Pa.

TABLE OF CONTENTS

	Page
Importance of White Pine	1
Purpose of the Blister Rust Control Program	1
Disease and Damage	2
Organization and Cooperation	2
The Status of Control	3
The Continuing Problem	4
Control Activities in 1955	4
Summary of Accomplishments on Lands of All Ownerships	4
Skilled Men are Needed for Survey Work	5
Ribes Eradication Methods	5
Nursery Sanitation	5
Canker Elimination	6
I & E Activities	6
Work on State and Private Lands	6
Work on National Forests	7
Work on National Parks	7
Abnormal Growth of White Pine	7
Recommendations	8
Appendix	9
Table 1 - Informational & Service Activities - 1955	10
Table 2 - Local Cooperation on Blister Rust Control	11
Table 3 - Surveys During 1955	12
Table 4 - Ribes Eradication During 1955	13
Table 5 - Maintenance Activities During 1955	14
Table 6 - Status of Blister Rust Control by States & Districts	15
Table 7 - Status of Blister Rust Control by States and Ownership Classes	16

IMPORTANCE OF WHITE PINE

White pine occupies a prominent place in the commercial forests of the east. The range extends from the foothills in New England to the higher mountain elevations in northern Georgia. Over 7¼ million acres of white pine are charted for protection from blister rust. Although white pine may be found on many thousand additional acres, the trees are too scattered or the stands too small to justify the cost of control measures. The maturity value of the stands scheduled for protection exceeds $800 million. Watershed, aesthetic and recreational values are equally great. From 1911 to date production of white pine in the Eastern Region has averaged close to 600 million board feet per year.

White pine is important in our fast growing economy. This species should receive special attention in this region if our forests are to meet future demands for wood products. White pine grows rapidly, producing as much as 1,000 board feet per acre per year. It responds well to good management practices and the per acre yield of white pine can be greatly increased through removal of inferior competing species. A comparison of the timber producing capabilities of white pine with those of oak was afforded this summer at a timber sale site on the Monongahela National Forest. A 22" oak 240 years old produced 1½ sixteen foot logs, while a nearby 22" white pine 80 years old produced four sixteen foot logs.

White pine is a natural resource that adds much to the welfare of the region and the nation. The blister rust problem was created by nature and the cost of control is to a large extent dictated by the natural distribution of ribes. Present owners of young white pine, the timber crop of the future, have little incentive to invest money in protection knowing that financial benefits will not accrue during their lives. Because of the complexities of the problem, and the fact that loss of white pine would affect everyone, protection of this resource is largely a public responsibility.

PURPOSE OF THE BLISTER RUST CONTROL PROGRAM

The purpose of the program is to establish and maintain control of the disease in white pine stands that show promise of sufficient values at maturity to warrant the cost of control measures. Selection of stands to be protected is based on quality, quantity and age of the pine. The 7¼ million acres of

white pine in the eastern region comprise approximately 2/3 of the total pine acreage in the U. S. designated for protection. About 10% is federally-owned and 5% is in state or local public ownership. The remaining 85% is distributed among some 222,000 private owners.

The immediate objective is to bring at least 90% of the control program in the region to a maintenance basis by the end of 1956.

DISEASE AND DAMAGE

In the region, control has progressed to the point where heavy damage from blister rust is seldom found. Of particular concern however, is the loss of natural white pine reproduction on cut-over areas that could be prevented through prompt application of control measures. Such losses continue in sections where the control program is inadequately financed. Studies on two quarter-acre plots in Maine revealed 72% of the pine infected on one and 50% on the other.

Infection on ribes was medium to heavy in the northern part of the region this year and light in the southern part. In Massachusetts, where 95% of the control program is on a maintenance basis, heavy infection was found on ribes in 1955. This indicates the need for maintaining as nearly ribes free conditions as possible in the vicinity of valuable white pine stands.

ORGANIZATION AND COOPERATION

The Lea Act of April 26, 1940 (58 Stat. 168; 16 U.S.C. 594a.) authorizes the Secretary of Agriculture to cooperate with states and other agencies in control of blister rust. The Act is implemented by the Forest Service in this region through the activities of 24 district leaders under the supervision of three area leaders. These men and a Blister Rust Control Section in the Division of State and Private Forestry, Region 7, provide leadership and technical direction for blister rust control activities on lands of all ownerships.

Twelve of the 18 white pine producing states in Regions 7 & 8 cooperated in the blister rust control program this year. No work was needed in the other six states, namely, Delaware, Georgia, Kentucky, New Jersey, Rhode Island and South Carolina. Funds are adequate and control work is progressing on proper schedule in all but four states. In Maine, New Hampshire, Vermont and Virginia the program is making comparatively slow progress. Activities in West Virginia were stepped up considerably in 1955 when the

State more than tripled its contribution for blister rust control. It will be necessary to proceed at this pace for several years to bring the program in West Virginia to a maintenance basis.

During 1955 state and local agencies provided $328,899 or 56% of all funds chargeable to the program on state and private lands. The extent to which local agencies have cooperated in the blister rust control program over the years is indicated in Table 2.

THE STATUS OF CONTROL

Control has been established on 15,420,449 acres or 87.5% of the present control area. Partial control has been established on an additional 11.2%. Under some conditions control is established in one operation, although in most cases further work at periodic intervals is needed to bring ribes growth to a tolerable minimum. When that point has been reached control can be maintained indefinitely through periodic inexpensive examinations to locate disturbances caused by fire, logging, construction, etc. plus prompt action to destroy any hazardous regeneration of ribes that may be found.

The following table shows the distribution of white pine and control area among the various ownerships and briefly indicates the status of control.

Ownerships	Acres of White Pine	Acres of Control Area	Percent of Control Area Initially Worked	Percent of Control Area On Maintenance
State and Private Lands	6,137,826	15,600,007	98.6	86.5
National Forests	1,059,002	1,861,405	99.9	95.3
National Parks	78,558	155,751	100.0	98.3
Indian Lands	22	445	100.0	100.0
Total	7,275,408	17,617,608	98.7	87.5

From the foregoing figures it can be readily determined that the bulk of remaining work is on state and private lands. It includes 220,773 acres that have never been worked and 1,885,523 acres that will need rework before control is established. Control work needed on National Forests includes

375 acres of initial work and 87,864 acres of rework. Only 2,624 acres of rework are needed on National Parks. Activities on federally owned lands are being performed on schedule.

Further details on the status of control are shown in Tables 6 and 7.

THE CONTINUING PROBLEM

Although excellent progress in control of the disease has been made, much remains to be done to insure adequate protection of the white pine resource of the region. The continuing problem is challenging. Future requirements include the performance of first work on 221,148 acres and rework on slightly less than 2 million acres. There is also the job of maintaining the safe conditions already established on an additional nine million acres. Examinations to locate disturbances that may have resulted in regrowth of ribes should be made every five to ten years. Experience to date indicates that intensive ribes eradication work will be required on less than 15% of the area examined. Men with training and experience in control operations and with competence of high order are needed to cope with the continuing problem.

It is believed that additional knowledge concerning factors that influence ribes regeneration and growth might prove useful in solving the maintenance problem. Steps have been taken to determine the feasibility of further studies in ribes ecology. Conferences are scheduled early in 1956 for the purpose of assembling and evaluating pertinent observations of blister rust personnel. Clarence R. Quick who has conducted studies in the ecology of western species of ribes will visit this region in May to aid in developing a further course of action.

CONTROL ACTIVITIES IN 1955

Summary of Accomplishments on Lands of All Ownerships

A total of 1,284,303 acres of control area was given attention in 1955. Of this, 63,916 acres were initially worked and 509,504 acres including 53,853 acres of maintenance area were reworked. Examination of the remaining 710,883 acres revealed that no intensive ribes eradication work was needed to maintain the control previously established. A total of 2,271,634 ribes were destroyed in 1955. Additional data relative to accomplishments in 1955 are listed in Tables 3, 4 and 5.

Skilled Men are Needed for Survey Work

As maintenance activities become an increasingly greater part of the blister rust control job, the need for year-round employees especially skilled in examination work becomes more acute. Only New York, Connecticut, Pennsylvania, North Carolina and Tennessee provide sufficient, full-time personnel to do the needed amount of this work. In Maine, New Hampshire and Massachusetts much of the survey work has been accomplished only by shifting men between federal and state employment. This at best is not satisfactory because (1) The employees do not have job security, (2) it is difficult to attract good men to the job and (3) the work cannot be programmed efficiently. State funds for this type of work have recently been made available in West Virginia. The full-time federal employees in Virginia have been unable to keep up with the examination work needed on state and private lands.

Ribes Eradication Methods

(1) Hand eradication methods are used on the major portion of the control job, since most of the ribes encountered are of small size and in scattered locations. In many instances one man can complete all needed work on sizable portions of a control area. Two, three or four-man crews are used on those sections requiring more intensive coverage.

(2) The use of chemicals in the eradication of ribes has been increasing steadily over the past few years. It is standard practice to use an aqueous solution of 2, 4, 5-T to destroy concentrations of skunk currants or wild black currants. Tests of various solutions and methods of application of this chemical are producing promising results on other species of ribes found in this region. A dry mixture of salt and borax applied to the crowns of decapitated bushes is still widely used to save labor and to ensure a complete kill of large or firmly rooted ribes.

Nursery Sanitation

Approximately 28 million white pine are growing in the 32 nurseries of the region that produce white pine forest-planting stock. Eight of these nurseries are private, 23 are state-owned and one, the TVA nursery, is federal. The environs of fifteen of these nurseries were examined this year. Ribes were found in the protection zones of three. Sanitation work at all of these nurseries has been on a maintenance basis for several years and does not present much of a control problem.

Canker Elimination

Canker elimination work was performed in New York and North Carolina. A total of 6,531 large white pine trees at state campsites in New York were examined for blister rust cankers. One hundred sixty-one cankers were removed from 83 of them by pruning branches, excising the infected bark, or removing diseased tops. An additional 461 trees too far gone to be saved were cut down. In North Carolina the district leader examined 150 trees; fifty were cut down and 200 cankers were removed from the others.

I & E Activities

Classroom and field instruction concerning blister rust and its control was presented to forestry students in eight colleges or universities. Special effort is made to see that forestry students receive an introduction to blister rust. They are taught how to recognize the disease, how to apply control measures, and how forest management influences control.

Through attendance at meetings, radio talks, news items, show-me trips, use of BR films and numerous personal contacts, field personnel brought information concerning blister rust to the attention of pine owners. Data concerning these activities are presented in Table 1.

Increased interest in white pine management among public and private foresters has directed more attention to damage by blister rust. Blister rust control personnel frequently lend assistance in management activities. In return, many management foresters have been active in stimulating local participation in the blister rust control program.

WORK ON STATE AND PRIVATE LANDS

Twelve states participated in the program this year. A total of 1,471,181 acres of control area was examined and of this 504,280 acres were mapped. As a result of surveys and eradication work 86 percent of the control area is now on maintenance, an increase of 475,467 acres over last year.

This year for the first time maintenance activities exceeded pre-maintenance activities. A total of 664,802 acres on maintenance were examined and of this 48,623 acres required intensive eradication work. The remaining 616,179 acres were continued on maintenance without further attention. Pre-maintenance eradication totalled 555,440 acres of which 62,148 acres were initial and 493,292 acres were rework. Increases in town funds in Maine, State funds in West Virginia, and federal funds for work on state and private lands were responsible for the large volume of work accomplished.

WORK ON NATIONAL FORESTS

Control work on national forest lands in Regions 7 & 8 is on schedule. Eleven national forests have 1,861,405 acres of control area including 1,059,002 acres of white pine. During 1955 no work was performed on eight of these forests. Surveys or ribes eradication work were performed on the George Washington, Jefferson and North Carolina National Forests.

A total of 118,600 acres of control area was examined on national forest land - 92,780 on the George Washington, 23,088 acres on the Jefferson and 2,732 acres on the North Carolina National Forests. Of the total, 4,325 acres were mapped. Proposed white pine planting sites were examined on the North Carolina National Forests. Four were found to have too many ribes and alternate sites were located. Activities of this type represent excellent use of trained personnel and bring about greater economy in growing disease-free white pine.

A total of 98,989 ribes were destroyed while working 17,268 acres of control area. The bulk of the area worked or 17,098 acres was on the George Washington. Only 170 acres were worked on the North Carolina. Blister rust work on national forest lands is closely integrated with control work on state and private lands. Careful scheduling of operations makes it possible to use the same crews and equipment on both.

WORK ON NATIONAL PARKS

There are 155,751 acres of control area including 78,558 acres of white pine on five national parks in this region. Control has been established on all but 2,624 acres. Maintenance examinations were performed on three of the parks this year - Acadia, Shenandoah and the Blue Ridge Parkway. At Acadia, 6,141 acres, mostly in the unburned portion, were examined. Intensive ribes eradication work was needed on only 18 acres. On the Shenandoah 2,154 acres were examined and 660 acres required intensive work. Chemicals were used in an attempt to destroy gooseberries which persisted in heavy sod on an area of 240 acres. The bushes were sprayed with an aqueous solution of 2, 4, 5-T. Of the 51 acres examined on the Blue Ridge Parkway, 34 required intensive work.

ABNORMAL GROWTH OF WHITE PINE

Many white pine trees in northern New England and New York produced a peculiar growth this year. The leader buds did not develop while lateral buds made abnormal growth. Lateral shoots were thicker than normal. Needle bundles were rather sparsely spaced and contained from 3 to eleven or more needles of varying lengths. Later development of adventitious buds on the new

growth gave a broom-like appearance to this year's twigs. The cause is not definitely known but extra-seasonal growth late in 1954 may be responsible. Such growth will sometimes upset mormal development which may result in the abnormal characteristics noted this year.

RECOMMENDATIONS

1. That the allotment of federal leadership funds for Regions 7 & 8 in fiscal year 1957 be the same as in 1956.

2. That $121,000 of federal funds be allotted to Region 7 for control operations on state and private lands during fiscal year 1957. State and local agencies are annually contributing nearly three times this amount.

3. That the Forest Service Branch of Research investigate the importance of eastern white pine to the economy of Regions 7 and 8.

4. That the Northeast Forest Experiment Station undertake studies in ribes ecology designed to solve some of the ribes suppression problems.

5. That every effort be made to strengthen the program in Maine, New Hampshire, Vermont and Virginia through increased participation by state and local agencies. It would be highly desirable if each of these states would provide two to six full-time field men for blister rust control.

6. That uniform terms be adopted by all regions to designate blister rust control operations which are similar in objective.

7. That special efforts be continued toward complete modernization of the blister rust control transportation equipment.

APPENDIX

Statistical Tables

Table 1 - Informational & Service Activities - 1955

State	Meetings Addressed		No. Radio Talks	No. Items Published	No. Demonstrations Placed	Show-Me Trips	Film Showings	
	No.	Attendance					No.	Attendance
Me.	16	570	2	11	4	14	6	315
N. H.	66	4,770	3	82	11	13	9	387
Vt.	14	560	1	23	3	3	11	588
Mass.	--	--	--	--	--	--	--	--
Conn.	1	22	--	--	--	--	1	22
N. Y.	48	1,793	1	53	7	43	65	5,768
Pa.	3	112	2	13	2	2	5	271
Md.	--	--	--	--	--	--	--	--
Va.	5	49	--	--	5	13	7	225
W. Va.	12	459	--	2	1	13	8	330
N. Car.	2	42	--	2	--	7	4	110
Tenn.	--	--	--	--	--	--	--	--
Total	167	8,377	9	186	33	108	120*	8,241*

* Includes films shown in New Jersey and Flordia 4 225

Table 2 - Local Cooperation on Blister Rust Control

Work During 1955

State	No. of Cooperators			Amount Expended			
	Individuals	Towns	Counties	Individuals	Towns	Counties	Total
Me.	1	68	-	$199	$16,563	$	$16,762
N. H.	-	106	-	-	35,041	-	32,652
Vt.	1	27	-	120	6,832	-	6,952
Conn.	-	2	-	-	1,300	-	1,300
N. Y.	-	-	20	-	-	20,926	20,926
Total	2	203	20	$319	$59,736	$20,926	$78,592

Local Cooperation on Blister Rust Control Work

1918 - 1955 Inclusive

State	Individual Cooperation		Town Cooperation		County Cooperation	
	No. Cooperators	Amount Spent by Individual Cooperator	No. Town Appropriations or Contributions	Amount of Town Money Expended	No. County Appropriations or Allotments	Amount Spent by Counties
Me.	11,133	$ 86,309	1,504	$ 277,960	2	$ 601
N. H.	703	51,790	2,546	796,339	6	1,724
Vt.	2,388	77,761	452	99,334	-	
Mass.	21,975	119,354	73	28,358	-	
R. I.	8	581	-	-	-	
Conn.	527	12,670	216	44,798	-	
N. Y.	5,990	177,157	39	10,831	245	284,326
Pa.	303	2,273	-	-	-	
Va.	1	276	-	-	-	
W. Va.	1	358	-	-	-	
Total	43,029	$528,529	4,830	$ 1,257,620	253	$286,651

Table 3 - Surveys During 1955

State	Ownership	Acreage of Control Area		Total Man-Days
		Examined for Any Purpose	Mapped	
Maine	S & P	162,313	97,108	1,311
Maine	Nat'l Park	6,141	- -	37
N. H.	S & P	382,258	128,630	1,204
Vt.	S & P	64,444	22,802	309
Mass.	S & P	73,508	18,637	241
Conn.	S & P	59,283	16,627	149
N. Y.	S & P	501,754	163,306	3,009
Penna.	S & P	137,013	43,142	516
Md.	S & P	587	79	5
Va.	S & P	61,540	13,949	329
Va.	USFS	109,644	3,525	489
Va.	Nat'l Park	2,154	- -	69
W. Va.	S & P	24,418	- -	170
W. Va.	USFS	6,224	800	37
N. Car.	S & P	2,788	- -	7
N. Car.	USFS	2,732	270	16
N. Car.	Nat'l Park	- -	- -	114
Tenn.	S & P	1,275	- -	5
TOTALS	S & P	1,471,181	504,280	7,255
	USFS	118,600	4,595	542
	Nat'l Park	8,295	- -	220
	All	1,598,076	508,875	8,017

RIBES ERADICATION WORK DURING 1955

State, National Forest or National Park	First Work			Rework			Maintenance Work			All Work			Acres Per Man Day	Per Acre Values	
	Acres	Ribes	Man Days	Acres	Ribes	Man Days	Acres	Ribes	Man Days	Acres	Ribes	Man Days		Man Days	Ribes
Ribes Eradication on S&P Lands															
Me.	6,271	26,800	225	120,999	240,286	2,377	257	20,994	90	127,527	288,080	2,692	47.4	.021	2.3
N. H.	8,807	46,634	281	155,148	467,702	2,646	1,087	62,754	218	165,042	577,090	3,145	52.5	.019	3.5
Vt.	15,688	59,232	581	8,562	38,947	466	10,885	63,755	481	35,135	161,934	1,528	23.0	.043	4.6
Mass.	5,541	6,016	75	25,047	35,563	363	779	6,143	30	31,367	47,722	468	67.0	.015	1.5
Conn.	-	-	-	-	-	-	2,464	45,977	153	2,464	45,977	153	16.1	.062	18.7
N. Y.	17,309	151,323	851	106,762	496,446	3,998	29,044	138,523	838	153,115	786,292	5,687	26.9	.037	5.1
Pa.	2,900	13,036	98	14,850	25,521	316	3,794	17,906	375	21,544	56,463	789	27.3	.037	2.6
Md.	85	22,610	34	542	33,699	134	-	-	-	627	56,309	168	3.7	.268	89.8
Va.	4,860	39,166	497	1,920	8,218	269	55	917	7	6,835	48,301	773	8.8	.113	7.1
W. Va.	340	6,812	50	10,839	86,571	1,339	-	-	-	11,179	93,383	1,389	8.0	.124	8.4
N. Car.	347	-	2	-	-	-	258	925	18	605	925	20	30.3	.033	1.5
Total-State & Private	62,148	371,629	2,694	444,669	1,432,953	11,908	48,623	357,894	2,210	555,440	2,162,476	16,812	33.0	.030	3.9
Ribes Eradication on National Forests															
North Car. N. F.	170	27	1	-	-	-	-	-	-	170	27	1	170.0	.006	.2
Geo. Va.	775	3,274	130	9,343	49,317	1,688	4,518	21,943	778	14,636	74,534	2,596	5.6	.177	5.1
Washington W. Va.	823	16,575	119	1,639	7,853	189	-	-	-	2,462	24,428	308	8.0	.125	9.8
Total	1,598	19,849	249	10,982	57,170	1,877	4,518	21,943	778	17,098	98,962	2,904	5.9	.170	5.8
Total National Forests	1,768	19,876	250	10,892	57,170	1,877	4,518	21,943	778	17,268	98,989	2,905	5.9	.168	5.7
Ribes Eradication on National Parks															
Acadia - Me.	-	-	-	-	-	-	18	379	3	18	379	3	6.0	.167	21.1
Shenandoah - Va.	-	-	-	-	-	-	660	9,189	105	660	9,189	105	6.3	.159	13.9
Blue Ridge Pky.-N.Car.	-	-	-	-	-	-	34	601	9	34	601	9	3.8	.265	17.7
Total - National Parks	-	-	-	-	-	-	712	10,169	117	712	10,169	117	6.1	.164	14.3
Ribes Eradication on All Lands															
Me.	6,271	26,800	225	120,999	240,286	2,377	275	21,373	93	127,545	288,459	2,695	47.3	.021	2.3
N. H.	8,807	46,634	281	155,148	467,702	2,646	1,087	62,754	218	165,042	577,090	3,145	52.5	.019	3.5
Vt.	15,688	59,232	581	8,562	38,947	466	10,885	63,755	481	35,135	161,934	1,528	23.0	.043	4.6
Mass.	5,541	6,016	75	25,047	35,563	363	779	6,143	30	31,367	47,722	468	67.0	.015	1.5
Conn.	-	-	-	-	-	-	2,464	45,977	153	2,464	45,977	153	16.1	.062	18.7
N.Y.	17,309	151,323	851	106,762	496,446	3,998	29,044	138,523	838	153,115	786,292	5,687	26.9	.037	5.1
Pa.	2,900	13,036	98	14,850	25,521	316	3,794	17,906	375	21,544	56,463	789	27.3	.037	2.6
Md.	85	22,610	34	542	33,699	134	-	-	-	627	56,309	168	3.7	.268	89.8
Va.	5,635	42,440	627	11,263	57,535	1,957	5,233	32,049	890	22,131	132,024	3,474	6.1	.157	6.0
W. Va.	1,163	23,387	169	12,478	94,424	1,528	-	-	-	13,641	117,811	1,697	8.0	.124	8.6
N. Car.	517	27	3	-	-	-	292	1,526	27	809	1,553	30	27.0	.037	1.9
Total	63,916	391,505	2,944	455,651	1,490,123	13,785	53,853	390,006	3,105	573,420	2,271,634	19,834	28.9	.035	4.0

Table 5 - Maintenance Activities During 1955

State	Ownership	Total Acreage Examined	Portion Requiring Intensive Control Measures					
			Number Acres Worked	Number Ribes Destroyed	Man Days	Acres Per Man Day	Per Acre Values: Man Days	Per Acre Values: Ribes
Maine	State & Private	80,612	257	20,994	90	2.9	.350	81.7
"	National Park	6,141	18	379	3	6.0	.167	21.1
N. H.	State & Private	85,145	1,087	62,754	218	5.0	.200	57.7
Vt.	State & Private	24,900	10,885	63,755	481	22.6	.044	5.9
Mass.	State & Private	55,531	779	6,143	30	26.0	.038	7.9
Conn.	State & Private	59,283	2,464	45,977	153	16.1	.062	18.7
N. Y.	State & Private	261,743	29,044	138,523	838	34.6	.029	4.8
Penna.	State & Private	60,181	3,794	17,906	375	10.1	.099	4.7
Va.	State & Private	34,989	55	917	7	8.0	.127	16.7
"	National Forest	88,863	4,518	21,943	778	5.8	.172	4.9
"	National Park	2,154	660	9,189	105	6.3	.159	13.9
W. Va.	National Forest	2,725	-	-	-	-	-	-
N. Car.	State & Private	1,843	258	925	18	14.3	.070	3.6
" "	National Park	51	34	601	9	3.8	.265	17.7
Tenn.	State & Private	575	-	-	-	-	-	-
Total	State & Private	664,802	48,623	357,894	2,210	22.0	.045	7.4
"	National Forest	91,588	4,518	21,943	778	5.8	.172	4.9
"	National Park	8,346	712	10,169	117	6.1	.164	14.3
All		764,736	53,853	390,006	3,105	17.3	.058	7.2

STATUS OF BLISTER RUST CONTROL WORK IN PRESENT NET CONTROL AREA IN THE EASTERN REGION BY STATES AND DISTRICTS - SEPTEMBER 30, 1955

State	District	Total Control Area	Acreage of White Pine	Net Acreage Worked		Acreage In Control Area					Percentage Of Net Control Area					
								Needing Further Attention			Worked			Needing Further Attention		
				Initial	Maintenance	Now On Maintenance	Requiring No Further Work	First Work	Rework	Maintenance	Initial	Maintenance	On Maintenance	First	Rework	Maintenance
Maine	Bradbury	721,456	219,061	646,239	43,105	462,065	-	75,217	184,174	462,065	89.6	6.0	64.0	10.4	25.6	64.0
	Pike	774,701	314,234	748,600	268	510,037	16,061	26,101	238,563	493,976	96.6	.1	65.8	3.4	30.8	63.8
	Calderara	770,799	377,791	770,799	15,603	667,571	86,486	-	103,228	581,085	100.0	2.0	86.6	-	13.4	75.4
	Totals for State	2,266,956	911,086	2,165,638	58,976	1,639,673	102,547	101,318	525,965	1,537,126	95.5	2.6	72.3	4.5	23.2	67.8
N. H.	Boomer	369,154	157,712	367,926	6,816	221,302	-	1,228	146,624	221,302	99.7	1.8	59.9	.3	39.7	59.9
	Codman	265,367	135,936	265,367	17,553	257,641	-	-	7,726	257,641	100.0	6.6	97.1	-	2.9	97.1
	Conner	702,438	354,015	702,438	19,890	665,046	-	-	37,392	665,046	100.0	2.8	94.7	-	5.3	94.7
	Curtis	601,338	294,572	600,073	6,915	463,638	225,253	1,265	136,435	238,385	99.8	1.1	77.1	.2	22.7	39.6
	Newman	187,475	106,841	187,475	814	111,476	-	-	75,999	111,476	100.0	.4	59.5	-	40.5	59.5
	Richardson	413,879	170,126	404,722	4,552	243,536	-	9,157	161,186	243,536	97.8	1.1	58.8	2.2	38.9	58.8
	Totals for State	2,539,651	1,219,202	2,528,001	56,540	1,962,639	225,253	11,650	565,362	1,737,386	99.5	2.2	77.3	.5	22.2	68.4
Vermont	Mulholland	203,136	42,466	164,147	443	80,370	-	38,989	83,777	80,370	80.8	.2	39.6	19.2	41.2	39.6
	Palmer	183,538	48,751	167,534	24,388	133,527	-	16,004	34,007	133,527	91.3	13.3	72.8	8.7	18.5	72.8
	Rose	359,697	89,592	355,485	6,729	342,606	6,804	4,212	12,879	335,802	98.8	1.9	95.2	1.2	3.6	93.4
	Totals for State	746,371	180,809	687,166	31,560	556,503	6,804	59,205	130,663	549,699	92.1	4.2	74.6	7.9	17.5	73.6
Mass.	Lilley	1,472,929	605,712	1,472,352	5,037	1,403,048	776,925	577	69,304	626,123	99.9	.3	95.3	.1	4.6	42.5
R. I.	Totals for State	147,778	64,018	147,778	104,440	147,778	147,778	-	-	-	100.0	70.7	100.0	-	-	-
Conn.	Miller	458,905	96,938	458,818	289,631	458,818	245,598	87	-	213,220	99.9	63.1	99.9	.1	-	53.5
N. Y.	Barber	704,487	188,762	699,915	148,610	579,776	1,460	4,572	120,139	578,316	99.4	21.1	82.3	.6	17.1	82.1
	Charlton	430,328	127,309	429,498	28,099	361,814	-	830	67,684	361,814	99.8	6.5	84.1	.2	15.7	84.1
	Harpp	611,251	285,644	611,251	312,796	587,367	-	-	23,884	587,367	100.0	51.2	96.1	-	3.9	96.1
	Hick	221,957	45,060	218,707	22,860	158,878	-	3,250	59,829	158,878	98.5	10.3	71.6	1.5	26.9	71.6
	Holoomb	224,200	73,476	222,595	26,182	177,015	2,335	1,605	45,580	174,680	99.3	11.7	79.0	.7	20.3	77.9
	Western N. Y.	138,003	25,670	126,196	11,328	59,522	-	11,807	66,674	59,522	91.4	8.2	43.1	8.6	48.4	43.1
	Totals for State	2,330,226	745,921	2,308,162	549,875	1,924,372	3,795	22,064	383,790	1,920,577	99.1	23.6	82.6	.9	16.5	82.4
N. J.	Totals for State	16,742	3,771	16,742	-	16,742	16,742	-	-	-	100.0	-	100.0	-	-	-
Penna.	DeBerti	153,517	30,064	153,027	20,878	137,217	34,308	490	15,810	102,909	99.7	13.6	89.4	.3	10.3	67.0
	Fatzinger	321,313	74,623	320,316	46,393	304,399	11,852	997	15,917	292,547	99.7	14.4	94.7	.3	5.0	91.0
	Totals for State	474,830	104,687	473,343	67,271	441,616	46,160	1,487	31,727	395,456	99.7	14.2	93.0	.3	6.7	83.3
Del.	Totals for State	6,186	242	6,186	-	6,186	6,186	-	-	-	100.0	-	100.0	-	-	-
Md.	Totals for State	164,559	70,742	164,559	-	152,444	54,553	-	12,115	97,891	100.0	-	92.6	-	7.4	59.5
Ky.	Keaton	146,314	48,179	146,314	-	146,314	146,209	-	-	105	100.0	-	100.0	-	-	.1
W. Va.	Keaton	739,079	326,247	739,079	2,107	617,352	172,031	-	121,727	445,321	100.0	.3	83.5	-	16.5	60.3
Va.	Cramer	2,041,774	784,833	2,017,049	24,718	1,897,321	396,094	24,725	119,728	1,501,227	98.8	1.2	92.9	1.2	5.9	73.5
Ga.	Stegall	674,355	544,478	674,355	-	674,015	674,015	-	340	-	100.0	-	99.9	-	.1	-
N. Car.	Stegall	1,629,565	734,299	1,629,530	-	1,623,509	1,589,505	35	6,021	34,004	99.9	-	99.6	.1	.3	2.1
S. Car.	Stegall	130,870	64,192	130,870	-	130,870	130,870	-	-	-	100.0	-	100.0	-	-	-
Tenn.	Stegall	1,630,518	770,052	1,630,518	-	1,621,249	1,603,187	-	9,269	18,062	100.0	-	99.4	-	.6	1.1
Grand Total	All States	17,617,608	7,275,408	17,396,460	1,190,155	15,420,449	6,344,252	221,148	1,976,011	9,076,197	98.7	6.8	87.5	1.3	11.2	51.5

STATUS OF BLISTER RUST CONTROL, BY STATES AND OWNERSHIP CLASSES, IN THE NET CONTROL AREA OF THE EASTERN REGION - SEPTEMBER 30, 1955

State	Land Ownership	Total Control Area	Acreage of White Pine	Net Acreage Worked		Acreage In Control Area					Percentage Of Net Control Area					
								Needing Further Attention			Worked		On Maintenance	Needing Further Attention		
				Initial Work	Maintenance	Now on Maintenance	Requiring No Further Work	First Work	Rework	Maintenance	First	Maintenance		First	Rework	Maintenance
Maine	State and Private	2,247,779	906,886	2,146,461	50,129	1,620,998	102,547	101,318	525,463	1,518,451	95.5	2.3	72.1	4.5	23.4	67.6
N. H.	"	2,536,367	1,217,917	2,524,717	55,300	1,959,355	225,253	11,650	565,362	1,734,102	99.5	2.2	77.2	.5	22.3	68.4
Vt.	"	744,063	180,265	684,858	31,560	554,195	6,804	59,205	130,663	547,391	92.0	4.2	74.5	8.0	17.5	73.6
Mass.	"	1,472,929	605,712	1,472,352	5,037	1,403,048	776,925	577	69,304	626,123	99.9	.3	95.3	.1	4.6	42.5
R. I.	"	147,778	64,018	147,778	104,440	147,778	147,778	-	-	-	100.0	70.7	100.0	-	-	-
Conn.	"	458,905	96,938	458,818	289,631	458,818	245,598	87	-	213,220	99.9	63.1	99.9	.1	-	53.5
N. Y.	"	2,329,271	745,755	2,307,207	549,875	1,924,372	3,795	22,064	382,835	1,920,577	99.1	23.6	82.6	.9	16.5	82.5
N. J.	"	16,742	3,771	16,742	-	16,742	16,742	-	-	-	100.0	-	100.0	-	-	-
Pa.	"	470,745	103,730	469,258	67,031	437,646	46,160	1,487	31,612	391,486	99.7	14.2	93.0	.3	6.7	83.2
Del.	"	6,186	242	6,186	-	6,186	6,186	-	-	-	100.0	-	100.0	-	-	-
Ky.	"	114,312	31,199	114,312	-	114,312	114,282	-	-	30	100.0	-	100.0	-	-	.1
Md.	"	164,559	70,742	164,559	-	152,444	54,553	-	12,115	97,891	100.0	-	92.6	-	7.4	59.6
Va.	"	1,484,212	533,360	1,459,862	9,873	1,393,713	384,412	24,350	66,149	1,009,301	98.4	.7	93.9	1.6	4.5	68.0
W. Va.	"	576,499	235,629	576,499	1,399	484,069	142,798	-	92,430	341,271	100.0	.2	84.0	-	16.0	59.2
Ga.	"	324,452	248,576	324,452	-	324,302	324,302	-	150	-	100.0	-	99.9	-	.1	-
N. Car.	"	1,362,537	582,009	1,362,502	-	1,359,809	1,356,838	35	2,693	2,971	99.9	-	99.8	.1	.2	.2
S. Car.	"	77,008	45,398	77,008	-	77,008	77,008	-	-	-	100.0	-	100.0	-	-	-
Tenn.	"	1,065,663	465,679	1,065,663	-	1,058,916	1,042,155	-	6,747	16,761	100.0	-	99.4	-	.6	1.6
Sub-Total	State and Private	15,600,007	6,137,826	15,379,234	1,164,275	13,493,711	5,074,136	220,773	1,885,523	8,419,575	98.6	7.5	86.5	1.4	12.1	54.0
						National Forests										
Me. & N. H.	White Mountain	5,589	2,285	5,589	1,240	5,087	-	-	502	5,087	100.0	22.2	91.0	-	9.0	91.0
Vt.	Green Mountain	2,308	544	2,308	-	2,308	-	-	-	2,308	100.0	-	100.0	-	-	100.0
Pa.	Allegheny	4,085	957	4,085	240	3,970	-	-	115	3,970	100.0	5.9	97.2	-	2.8	97.2
Ky.	Cumberland	32,002	16,980	32,002	-	32,002	31,927	-	-	75	100.0	-	100.0	-	-	.2
Va.	Jefferson	118,743	61,612	118,743	2,209	114,843	9,008	-	3,900	105,835	100.0	1.9	96.7	-	3.3	89.1
Va. & W. Va.	Geo. Washington	495,109	229,404	494,734	12,124	430,262	7,300	375	64,472	422,962	99.9	2.4	86.9	.1	13.0	85.4
W. Va.	Monongahela	90,240	47,580	90,240	450	77,173	24,607	-	13,067	52,566	100.0	.5	85.5	-	14.5	58.3
Ga.	Chattahoochee	349,903	295,902	349,903	-	349,713	349,713	-	190	-	100.0	-	99.9	-	.1	-
N. Car.	National Forest	224,461	134,839	224,461	-	221,365	220,461	-	3,096	904	100.0	-	98.6	-	1.4	.4
S. Car.	Sumter	53,862	18,794	53,862	-	53,862	53,862	-	-	-	100.0	-	100.0	-	-	-
Tenn.	Cherokee	485,103	250,105	485,103	-	482,581	481,280	-	2,522	1,301	100.0	-	99.5	-	.5	.3
Sub-Total	National Forests	1,861,405	1,059,002	1,861,030	16,263	1,773,166	1,178,158	375	87,864	595,008	99.9	.9	95.3	.1	4.6	32.0
						National Parks										
Me.	Acadia	16,872	3,200	16,872	8,847	16,872	-	-	-	16,872	100.0	52.4	100.0	-	-	100.0
N. Y.	Saratoga Battlefield	955	166	955	-	-	-	-	955	-	100.0	-	-	-	100.0	-
Va.	Shenandoah	14,270	3,080	14,270	770	14,270	-	-	-	14,270	100.0	5.4	100.0	-	-	100.0
Va. & N. Car.	Blue Ridge	13,663	6,042	13,663	-	12,104	11,761	-	1,559	343	100.0	-	88.6	-	11.4	2.5
N.C. & Tenn.	Great Smoky	109,991	66,070	109,991	-	109,881	79,752	-	110	30,129	100.0	-	99.9	-	.1	72.5
Sub-Total	National Parks	155,751	78,558	155,751	9,617	153,127	91,513	-	2,624	61,614	100.0	6.2	98.3	-	1.7	39.6
						Indian Lands										
Cherokee	Indian Lands	445	22	445	-	445	445	-	-	-	100.0	-	100.0	-	-	-
Grand Total	All Ownerships	17,617,608	7,275,408	17,396,460	1,190,155	15,420,449	6,344,252	221,148	1,976,011	9,076,197	98.7	6.8	87.5	1.3	11.2	51.5

TABLE 8 — TOTAL FEDERAL, STATE AND LOCAL EXPENDITURES FOR ALL BLISTER RUST CONTROL ACTIVITIES DURING 1955

STATE	FEDERAL				STATE AND LOCAL COOPERATION	GRAND TOTAL
	FOREST SERVICE					
	LEADERSHIP	WORK ON S&P LANDS	WORK ON NATIONAL FORESTS	NATIONAL PARKS		
ME.	28,612	8,311	— —	743	37,846	75,512
N. H.	45,737	9,406	— —	— —	54,984	110,127
VT.	23,669	5,740	— —	— —	13,668	43,077
MASS.	10,183	2,326	— —	— —	9,025	21,534
CONN.	1,409	249	— —	— —	19,104	20,762
N. Y.	44,839	23,069	— —	— —	152,010	219,918
PENNA.	19,976	3,166	— —	— —	19,586	42,728
DEL.	83	— —	— —	— —	— —	83
MD.	783	960	— —	— —	1,161	2,904
VA.	13,304	6,159	41,065	2,542	6,918	69,988
W. VA.	11,967	9,041	7,106	— —	12,053	40,167
N. CAR.	136	— —	1,000	2,555	1,344	5,035
TENN.	136	— —	— —	— —	1,200	1,336
TOTAL	200,834	68,427	49,171	5,840	328,899	653,171

REGIONAL OFFICE COSTS ARE INCLUDED IN THE ABOVE AND PRORATED BY STATES.

TABLE 9 — BREAKDOWN OF STATE AND LOCAL COOPERATIVE EXPENDITURES AND CONTRIBUTED SERVICES DURING 1955

STATE	CASH EXPENDITURES					VALUE OF CONTRIBUTED SERVICES		STATE INDIRECT AID	TOTAL
	STATE	TOWNS	COUNTIES	INDIVIDUALS	SUB-TOTAL	STATE	COUNTY TOWN INDIVID.		
ME.	$19,084	$16,563	$ — —	$ 199	$35,846	$ 1,000	$ — —	$ 1,000	$ 37,846
N. H.	19,043	35,041	— —	— —	54,084	420	— —	480	54,984
VT.	4,896	6,832	— —	120	11,848	166	— —	1,654	13,668
MASS.	8,070	— —	— —	— —	8,070	325	— —	630	9,025
CONN.	17,196	1,300	— —	— —	18,496	250	— —	358	19,104
N. Y.	113,099	— —	20,086	— —	133,185	12,723	840	5,262	152,010
PA.	15,866	— —	— —	— —	15,866	1,080	— —	2,640	19,586
MD.	878	— —	— —	— —	878	133	— —	150	1,161
VA.	5,218	— —	— —	— —	5,218	300	— —	1,400	6,918
W. VA.	10,753	— —	— —	— —	10,753	600	— —	700	12,053
N. CAR.	1,044	— —	— —	— —	1,044	300	— —	— —	1,344
TENN.	900	— —	— —	— —	900	300	— —	— —	1,200
TOTAL	$216,047	$59,736	$20,086	$ 319	$296,188	$17,597	$ 840	$14,274	$328,899

Region 9

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

ANNUAL REPORT

WHITE PINE BLISTER RUST CONTROL

NORTH CENTRAL REGION

CALENDAR YEAR 1955

Division of State & Private Forestry
Blister Rust Control Section
In Cooperation With
Federal, State, County and Local Agencies

Milwaukee, Wisconsin
January, 1956

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Blister Rust Control Program Annual Report

North Central Region, Calendar Year 1955

The Blister Rust Control Project operated throughout the year without any major changes in policy or personnel. The only organizational change was moving the Area Leader's office from Traverse City to East Lansing, Michigan.

Organization and Responsibility

Blister rust control is a cooperative project in the Division of State and Private Forestry of the U. S. Forest Service. The BRC organization in this Region consists of a Project and Assistant Project Leader, 3 Area Leaders, 7 District Leaders, and 4 State Agents. This organization is responsible for the leadership, coordination and technical direction of the program on lands of all ownerships. Authority for doing the work on State and private lands is contained in the Insect Pest and Plant Disease laws of the cooperating states. Federal participation is granted under the Lea Act. Labor is supplied by the pine owners and land-managing agencies.

Status of the Rust

Blister rust is widespread throughout the Region, ranging from very heavy in the north to very light in the south. Commercial damage has been averted in protected stands while serious losses have been sustained in unprotected stands, especially in the northern part of the Region. No rust spread to new counties was observed on either pine or ribes in 1955.

Accomplishments in 1955

Surveys

As a result of surveys, as shown in Table 1, the control problem was increased by 43,248 acres of white pine and 88,062 acres of control area. Over half the increased acreage was turned up in Wisconsin, about a quarter in Michigan, and the remainder in Minnesota, Ohio and Illinois. Natural reproduction in the northern part of the Region was the principal factor in the increase, though planting also contributed a considerable acreage farther south. The survey work was done principally by year-round BRC personnel before and after the ribes eradication season.

Local Control

The Region protected 57,571 acres of white pine by destroying over 1-3/4 million ribes on 124,286 acres of control area at an expenditure of 14,481 man-days in 1955. Compared with last year this represents 26% more acres pine protected, 30% more acres worked, 11% more ribes destroyed with an increased expenditure of only 7% more man-days. A large amount of this additional accomplishment was due to increased participation in the control program by the states and by private owners.

Most of the ribes eradication work was done by hourly-paid labor except in Michigan where quite a bit of prison labor was used on state and private lands. Some work was done by contract, especially on National Forests in Michigan, and a few on privately-owned areas in Wisconsin. Most of the control work was done by uprooting ribes but chemicals were used wherever practicable. All work in Illinois and some in Michigan, Wisconsin and Minnesota totaling 2,184 acres, was done with chemicals.

Checking

Checking after eradication showed that work of satisfactory quality had been done on practically all areas. Of the 124,286 acres worked 116,998 acres were checked, revealing that 98.5 percent had less than 15 feet of live stem per acre remaining, and that 99.7 percent contained less than 25 FLS. Only 382 acres were found to have more than 25 FLS remaining and these will be reworked in the spring of 1956. In addition 7,288 acres were worked but not formally checked, either because insufficient ribes were found to justify the cost of a formal check, or checking was postponed until the spring of 1956. This includes 2,184 acres on which chemical ribes eradication was performed and on which checking of results must necessarily be postponed for a year.

Nursery Sanitation

Nursery sanitation was performed around 4 state-owned nurseries, all in Wisconsin. Ribes-free conditions are being maintained around 43 nurseries producing about 25 million white pines annually in the Region.

Canker Pruning

Cankers were removed to save 8,830 infected white pines growing in protected stands in Michigan, Minnesota and Iowa.

Status of Control

The total control problem in the Region involves 1,262,382 acres of white pine and 3,735,979 acres of control area. This is an increase of 30,136 acres of pine and 49,276 acres of control area over a year ago.

To date 85.8 percent of the total has been worked initially and 44.6 percent is on maintenance.

The program is fairly well on schedule for all classes of public ownership, especially on National Forests and Indian Reservations, but lags on state lands and is far behind on private lands. Of the 2,069,790 acres in the region needing initial and rework, 1,403,617 acres or 67 percent are in private ownership. While state and private participation has been increasing each year the rate at which privately-owned pine is being protected at the present time is still not great enough to catch up with the need.

Work Plans

Long-term work plans for National Forests and Indian Reservations have been prepared and are being followed. A fairly constant schedule of work can be maintained on federal lands because of known annual budgets. Long-range work plans have also been prepared for state and private lands but cannot be followed closely because funds for work on these lands are unpredictable and inadequate. The long-term plans do, however, serve as a basis for apprising cooperators and owners of the need for funds or labor for carrying out control work.

Informational Activities

It is the responsibility of the BRC organization to keep the public, and especially pine owners, informed about blister rust and its control. All media of disseminating information are used; radio, TV, newspapers, articles, posters, talks, etc. One of the most effective ways of having pine owners take action in protecting their trees is through personal contact. Most such contacts are made by regular personnel while engaged in survey work. The informational phase of the program is aimed at helping the pine owner help himself.

Other Work

Responsibility for Forest Service participation in forest pest control on state and private lands has been assigned to the BRC section. Authority for this work is contained in the Forest Pest Control Act, Public Law 110, of June 25, 1947. In cooperation with the Forest Experiment Stations the BRC organization will work with the cooperating states and individuals by imparting information about insect and disease outbreaks and control work occurring in other states of the Region, assisting in educational work, reporting insect outbreaks observed, and cooperating with states in controlling outbreaks to the extent prescribed by the Forest Pest Control Act.

BRC personnel will represent the Division of State and Private Forestry at the respective headquarters to an increasing extent as they become more familiar with the cooperative forestry activities of the Division.

Personnel, especially in Wisconsin, continued to assist University of Wisconsin pathologists in their white pine resistant to blister rust studies.

Studies in the effect of micro-climate on rust behavior which were begun three years ago by Van Arsdel under the direction of Dr. A. J. Riker are being continued by Dr. Richard Parmeter. Dr. Parmeter is employed by the Lake States Forest Experiment Station and is stationed at Madison, Wisconsin, where he is working in close collaboration with Dr. Riker. Earlier studies have pretty well established that micro-climate in many sections of the southern part of the Region is unfavorable to rust spread. The emphasis is now being placed in the northern part where the rust is more damaging. BRC personnel assist Dr. Parmeter in selecting areas to be studied.

Disease surveys were made in a number of worked areas to determine the degree of control accomplished. In most cases results indicated that control zone widths were adequate and the reduction in ribes feet of live stem had been sufficient to establish control. It was found that in a few areas where climatic conditions were especially favorable for the spread of the rust, the need for a greater live stem reduction and possibly widening of control zone widths is indicated. When we have learned more about rust behavior as the result of micro-climate studies in such areas, it may become necessary to adjust the standards of ribes FIS reduction and control zone widths where necessary and economically practical.

Costs

Total funds for control work in Calendar Year 1955 were greater than in 1954 due primarily to increased state and local participation. State and local contributions, $128,000, the highest ever, were higher by $16,000 than in 1954. This is tangible evidence that some progress is being made toward whittling down the large backlog of work that needs to be done to protect the pine in state and private ownership.

Recommendations

Because the current annual rate of protecting white pine areas, especially on private lands, is inadequate, every effort should be made to stimulate ribes eradication on these lands. This can be achieved by increased participation by cooperators and in improved techniques. It is recommended that:

1. Further diligent effort be made to acquaint private pine owners with the need for blister rust control on their lands and obtain their active support in eradicating ribes.

2. Ties with Service Foresters be strengthened so they will encourage their clients to regard blister rust control as a necessary part of white pine management.

3. Studies in use of chemicals as herbicides be continued and resultant improvements in formulations and techniques be adopted in the field as rapidly as possible.

4. The field be kept advised of the findings of micro-climate studies so that control practices can be adjusted as necessary.

5. Disease surveys be continued with the object of ascertaining just how much control is being accomplished under certain conditions of climate, cover, and ribes species in the high rust hazard zones of the north.

6. BRC personnel continue to learn more about other forest pests so that in their contacts with forest and woodlot owners they can render greater service.

Summary of White Pine Blister Rust Control - December 31, 1955

NORTH CENTRAL REGION

Estimated Commercial Value of White Pine in Control Area - $406,000,000

Local Control, 1955

Operating Agency	Acres Worked			Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Rework	Total			Ribes	Man-Day
State-Coop.	55,059	32,195	87,254	888,684	7,309	10.2	0.08
Nat. Forests	14,226	15,706	29,932	660,267	4,930	22.1	0.16
Ind. Service	880	6,220	7,100	232,064	2,242	32.7	0.32
Total	70,165	54,121	124,286	1,781,015	14,481	14.3	0.12

Status of Control (Net)

Item	National Forests	Ind. Reserv.	Non-Fed. Public	Private	Total
W.P. In Control Area, Acres	174,596	83,658	370,718	634,091	1,263,0
Total Control Area, Acres	352,298	140,540	942,945	2,300,195	3,735,9
Percent Worked Initially	90.2	96.6	90.6	82.5	85.8
Percent On Maintenance	66.8	77.6	45.1	39.0	44.6
Needing Initial Work, Acres	34,527	4,790	89,017	403,411	531,7
Needing Rework, Acres	82,339	26,721	428,779	1,000,206	1,538,0
Needing Maintenance Work, Acres	235,432	109,029	425,149	896,579	1,666,1

Blister Rust Infection, 1955: No new counties. **Cumulative:** On pines and ribes in all seven states. Most severe in north. Found on pines in 202 counties; on ribes in 390 counties in the region.

Nursery Sanitation, 1955: 4 state nurseries worked, all in Wisconsin. **Cumulative:** Ribes-free zones maintained around 40 nurseries, producing about 25 million white pine trees annually.

Canker Pruning, 1955: 14,155 cankers removed to save 8,830 infected trees; 3,150 fatally infected trees removed. Canker pruning done in Iowa, Michigan, Minnesota.

Surveying, 1955: 97,641 acres control area initially surveyed; 88,484 acres post-checked, and 82,486 acres retained.

Checking After Eradication, 1955: 116,998 acres checked for ribes after eradication, and all but 382 acres found satisfactory.

Control Area Permits, 1955: 383 applications received; 296 approved; 29 rejected; 58 voluntarily cancelled in Michigan, Minnesota, Ohio, Wisconsin.

Summary of White Pine Blister Rust Control - December 31, 1955

ILLINOIS

Estimated Commercial Value of White Pine in Control Area - $2,000,000

Local Control, 1955

Operating Agency	Acres Worked			Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Rework	Total			Ribes	Man-Days
State-Coop.	819	551	1,370	1,827	18	1.3	0.01

Status of Control (Net)

Item	Non-Federal Public	Private	Total
W.P. in Control Area, Acres	1,654	922	2,576
Total Control Area, Acres	8,070	5,306	13,376
Percent Worked Initially	95.6	91.9	94.1
Percent on Maintenance	30.7	17.4	25.4
Needing Initial Work, Acres	353	428	781
Needing Rework, Acres	5,241	3,957	9,198
Needing Maintenance Work, Acres	2,476	921	3,397

Blister Rust Infection, 1955: None. Cumulative: On pine in 12 counties, on ribes in 24 of the 102 counties in the state.

Nursery Sanitation, 1955: None. Cumulative: Ribes-free zones maintained around 2 nurseries.

Surveying, 1955: 1,161 acres control area initially surveyed; 558 acres post-checked.

Checking After Eradication, 1955: 1,727 acres checked for ribes after eradication, and all but 197 acres found satisfactory.

Summary of White Pine Blister Rust Control - December 31, 1955

INDIANA

Estimated Commercial Value of White Pine in Control Area - $7,000,000

Local Control, 1955 - None Performed

Status of Control (Net)

Item	National Forests	Non-Federal Public	Private	Total
W.P. in Control Area, Acres	18	3,169	7,560	10,747
Total Control Area, Acres	179	18,209	74,196	92,584
Percent Worked Initially	100.0	95.1	83.5	85.9
Percent on Maintenance	100.0	86.3	68.8	72.3
Needing Initial Work, Acres	-	887	12,213	13,100
Needing Rework, Acres	-	1,599	10,970	12,569
Needing Maintenance Work, Acres	179	15,723	51,013	66,915

Blister Rust Infection, 1955: No new counties. Cumulative: On white pine in 3 northern counties; on ribes in 53 of the 92 counties in the state.

Nursery Sanitation, 1955: None. Cumulative: Ribes-free zones maintained around 3 nurseries.

Summary of White Pine Blister Rust Control - December 31, 1955

IOWA

Estimated Commercial Value of White Pine in Control Area - $5,000,000

Local Control, 1955

Operating Agency	Acres Worked			Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Rework	Total			Ribes	Man-Days
State-Coop.	-	365	365	16,726	176	45.8	0.48

Status of Control (Net)

Item	Indian Reserv.	Non-Federal Public	Private	Total
W.P. in Control Area, Acres	50	609	2,485	3,144
Total Control Area, Acres	500	3,718	10,551	14,769
Percent Worked Initially	100.0	98.3	63.2	73.2
Percent on Maintenance	41.2	5.4	19.5	16.6
Needing Initial Work, Acres	-	64	3,887	3,951
Needing Rework, Acres	294	3,455	4,609	8,358
Needing Maintenance Work, Acres	206	199	2,055	2,460

Blister Rust Infection, 1955: No new counties. Cumulative: On pines in 11 counties in northeast Iowa; on ribes in 56 of 99 counties in the state.

Nursery Sanitation, 1955: None. Cumulative: Ribes-free zones maintained around 7 nurseries.

Canker Pruning, 1955: 43 cankers removed to save 19 trees; 7 fatally infected trees removed.

Surveying, 1955: 380 acres control area post-checked.

Summary of White Pine Blister Rust Control - December 31, 1955

MICHIGAN

Estimated Commercial Value of White Pine in Control Area - $164,000,000

Local Control, 1955

Operating Agency	Acres Worked			Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Rework	Total			Ribes	Man-Days
State-Coop.	11,022	20,703	31,725	419,343	3,323	13.2	0.10
Nat. Forests	9,650	9,950	19,600	180,886	1,096	9.2	0.06
Total	20,672	30,653	51,325	600,229	4,419	11.7	0.09

Status of Control (Net)

Item	National Forests	Non-Federal Public	Private	Total
W.P. in Control Area, Acres	80,061	147,883	221,766	449,710
Total Control Area, Acres	196,778	329,289	731,898	1,257,965
Percent Worked Initially	93.6	92.6	86.8	89.4
Percent on Maintenance	75.1	52.6	34.5	45.6
Needing Initial Work, Acres	12,605	24,464	96,345	133,414
Needing Rework, Acres	36,323	131,530	383,364	551,217
Needing Maintenance Work, Acres	147,850	173,295	252,189	573,334

Blister Rust Infection, 1955: No new counties. Cumulative: On pines in 55 counties; on ribes in all 83 counties in the state.

Nursery Sanitation, 1955: None. Cumulative: Ribes-free zones maintained around 9 nurseries.

Canker Pruning, 1955: 7,080 cankers removed to save 3,778 trees; 1,300 fatally infested trees destroyed.

Surveying, 1955: 20,629 acres control area initially surveyed, and 27,921 acres post-checked. Total control area increased by 19,446 acres.

Checking After Eradication, 1955: 49,013 acres checked for ribes after eradication, and all but 185 acres found satisfactory.

Control Area Permits, 1955: 101 applications received; 42 approved; 21 rejected; 38 voluntarily cancelled.

Summary of White Pine Blister Rust Control - December 31, 1955

MINNESOTA

Estimated Commercial Value of White Pine in Control Area - $41,000,000

Local Control, 1955

Operating Agency	Acres Worked			Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Rework	Total			Ribes	Man-Days
State-Coop.	344	2,009	2,353	147,361	1,084	62.6	0.46
Nat. Forests	1,210	2,980	4,190	279,341	2,066	66.7	0.49
Ind. Service	-	3,128	3,128	98,382	828	31.5	0.26
Total	1,554	8,117	9,671	525,084	3,978	54.3	0.41

Status of Control (Net)

Item	National Forests	Indian Reserv.	Non-Fed. Public	Private	Total
W.P. in Control Area, Acres	47,892	20,791	54,544	110,033	233,260
Total Control Area, Acres	72,325	30,899	111,124	316,930	531,278
Percent Worked Initially	80.1	97.2	58.6	70.2	70.7
Percent on Maintenance	45.2	73.9	18.2	15.1	23.3
Needing Initial Work, Acres	14,390	851	46,037	94,371	155,649
Needing Rework, Acres	25,231	7,217	44,900	174,563	251,911
Needing Maintenance Work, Acres	32,704	22,831	20,187	47,996	123,718

Blister Rust Infection, 1955: No new counties. Cumulative: On pines in 39 counties; on ribes in 38 of the 87 counties in the state. Rust prevalent in all pine-growing counties, especially severe in northeastern Minnesota.

Nursery Sanitation, 1955: None. Cumulative: Ribes-free zones maintained around 2 nurseries.

Canker Pruning, 1955: 7,032 cankers removed to save 5,033 trees; 1,843 fatally infected trees removed.

Surveying, 1955: 9,256 acres of control area initially surveyed; 10,482 acres past-checked.

Checking After Eradication, 1955: 6,762 acres checked for ribes after eradication, and all found satisfactory.

Control Area Permits, 1955: 55 applications received; 52 permits issued; 2 voluntarily withdrawn; 1 refused.

Summary of White Pine Blister Rust Control - December 31, 1955

OHIO

Estimated Commercial Value of White Pine in Control Area - $14,000,000

Local Control, 1955

Operating Agency	Acres Worked			Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Rework	Total			Ribes	Man-Days
State-Coop.	674	2,888	3,562	691	22	0.2	0.01

Status of Control (Net)

Item	National Forests	Non-Federal Public	Private	Total
W.P. in Control Area, Acres	515	7,949	14,096	22,560
Total Control Area, Acres	4,029	41,828	132,659	178,516
Percent Worked Initially	100.0	90.5	85.7	87.2
Percent on Maintenance	100.0	47.2	61.7	59.1
Needing Initial Work, Acres	0	3,977	18,913	22,890
Needing Rework, Acres	0	18,116	31,918	50,034
Needing Maintenance Work, Acres	4,029	19,735	81,828	105,592

Blister Rust Infection, 1955: No new counties. Cumulative: On pines in 11 counties; on ribes in 65 of the 88 counties in the state.

Nursery Sanitation, 1955: None. Cumulative: Ribes-free zones maintained around 7 nurseries.

Surveying, 1955: 674 acres control area initially surveyed; 9,835 acres post-checked, and 2,888 acres retained.

Checking After Eradication, 1955: 3,457 acres checked for ribes after eradication, and all found satisfactory.

Control Area Permits, 1955: 38 applications received; 14 permits issued; 18 voluntarily cancelled; 6 rejected.

Summary of White Pine Blister Rust Control - December 31, 1955

WISCONSIN

Estimated Commercial Value of White Pine in Control Area - $173,000,000

Local Control, 1955

Operating Agency	Acres Worked			Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Rework	Total			Ribes	Man-Days
State-Coop.	42,200	5,679	47,879	302,736	2,686	6.3	0.06
Nat. Forests	3,366	2,776	6,142	200,040	1,768	32.6	0.29
Ind. Service	880	3,092	3,972	133,682	1,414	33.7	0.36
Total	46,446	11,547	57,993	636,458	5,868	11.0	0.10

Status of Control (Net)

Item	National Forests	Indian Reserv.	Non-Fed. Public	Private	Total
W.P. in Control Area, Acres	46,110	62,817	154,910	277,229	541,066
Total Control Area, Acres	78,987	109,141	430,707	1,028,656	1,647,491
Percent Worked Initially	90.5	96.4	96.9	82.8	87.7
Percent on Maintenance	64.1	78.8	44.9	44.8	48.0
Needing Initial Work, Acres	7,532	3,939	13,235	177,254	201,960
Needing Rework, Acres	20,785	19,210	223,938	390,825	654,758
Needing Maintenance Work, Acres	50,670	85,992	193,534	460,577	790,773

Blister Rust Infection, 1955: Cumulative: On pines and ribes in all 71 counties in the state.

Nursery Sanitation, 1955: Boscobel, Gordon, Hayward and Trout Lake State Nurseries worked, using 99 man-days. Ribes-free conditions being maintained around 12 nurseries.

Surveying, 1955: 65,921 acres control area initially surveyed; 40,257 acres post-checked.

Checking After Eradication, 1955: 56,039 acres checked for ribes after eradication, and all found satisfactory.

Control Area Permits, 1955: 189 applications received; 188 approved; 1 rejected.

UNITED STATES FOREST SERVICE
Regional Office Milwaukee, Wisconsin
H. DEAN COCHRAN - Regional Forester

STATE DEPARTMENTS of AGRICULTURE AND CONSERVATION

Division of State & Private Forestry
MERLE S. LOWDEN - Chief

Blister Rust Control Section

Henry N. Putnam - Leader
John K. Kroeber - Asst. Leader

UNITED STATES INDIAN SERVICE

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MINNESOTA
St. Paul

L. B. Ritter - Area Leader
W. B. Roberts - Clerk-Stenographer *

AREA II
WISCONSIN
Madison

T. F. Kouba - Area Leader
H. F. Williams - Field Supervisor (A)
I. M. Goul - Clerk-Steno. **

AREA III
MICHIGAN
East Lansing

L. E. Nelson - Area Leader
W.A.E. - Clerk Stenographer

Walker, Minn.
J. N. Lieke - Dist. Leader

Duluth, Minn.
R. W. Nelson - Dist. Leader

Cable, Wis.
A. W. Depta - Dist. Leader

Antigo, Wis.
Ray Weber - Dist. Leader
G. O. Hill - Field Supvr. (A)

Escanaba, Mich.
S. M. Sager - Dist. Leader

Traverse City, Mich.
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IOWA
Oelwein
R. G. Hayes - Control Supervisor

ILLINOIS
Belvidere
E. D. Bergeson - Control Supervisor(A)

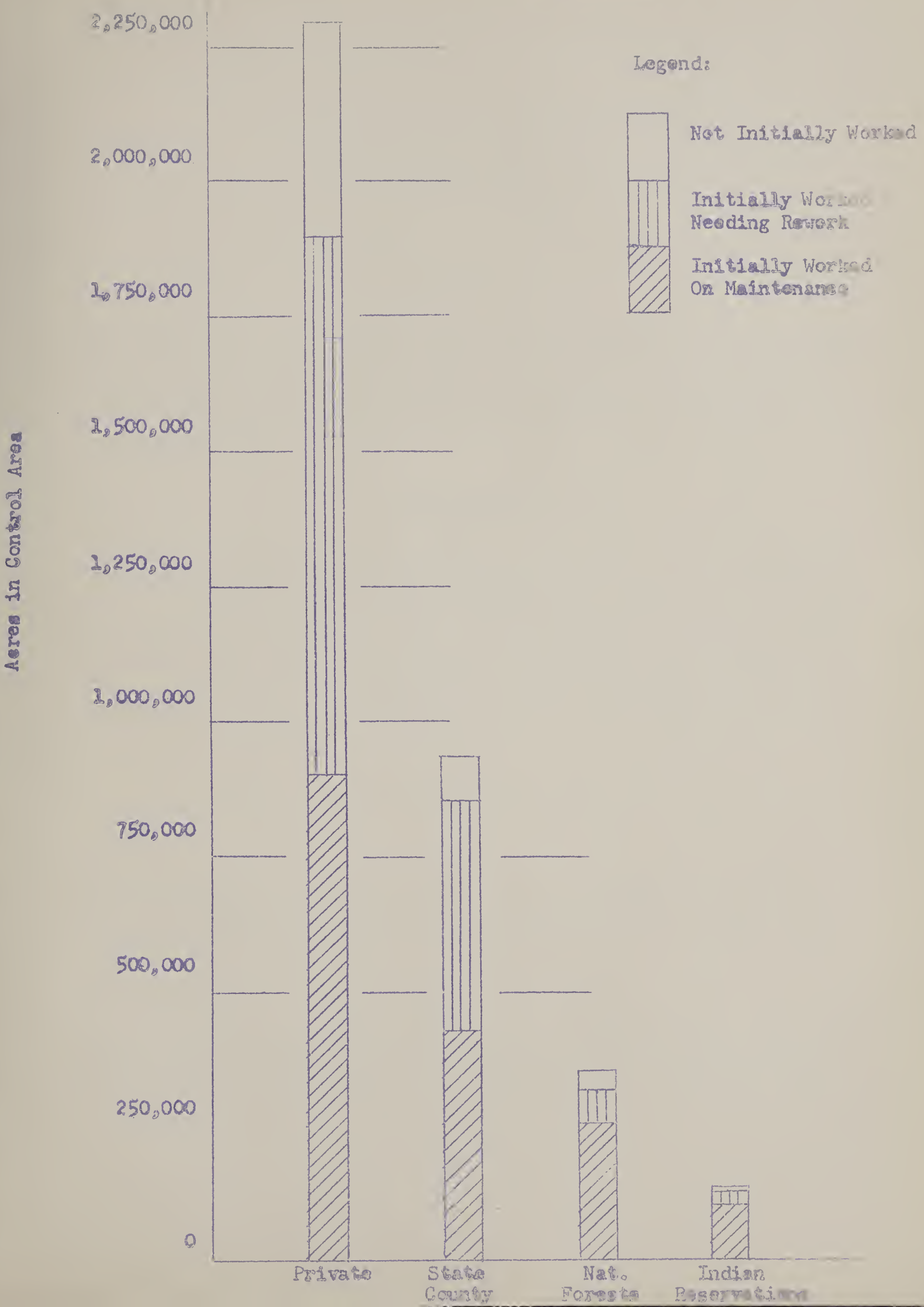
INDIANA
Indianapolis
R. G. Doerner - Control Supervisor

OHIO
Columbus
R. G. Doerner Control Supervisor

(A) - Employed on State Funds
* = Office space and clerical help shared with Barberry Eradication and Grasshopper Control
** = Office space and clerical help shared with Barberry Eradication

Chart 1. Blister Rust Control Organization, Dec. 31, 1955

Chart [illegible] Status of Control by Ownership Classes
K-9, on December 31, 1955



Blister Rust Control on National Forests

North Central Region, 1955

Objective

The objective is to establish and maintain protection against blister rust around all valuable white pine stands and nurseries on national forest lands. This is accomplished by suppression of ribes bushes within infecting distances of white pine stands, and maintenance of these conditions.

Organization of Work

The organization remained the same in 1955 as in 1954. The National Forest was responsible for selection of pine areas to be protected, and for furnishing labor and field supervision. The BRC organization directly supervised control work on all forests except the Superior, where the forest operated a camp. Responsibility for preparing work plans and maps, training, checking on adequacy of work, maintaining records, writing reports, remained with the BRC Section. Close cooperation between the Forest and the BRC organization was continued throughout the Region.

Current Work, 1955

Surveys

Pre-eradication survey and post-check were performed on all forests in Michigan, Minnesota and Wisconsin. The application of these data to the control problem is shown in Text Table 2.

Local Control

Ribes eradication in 1955 was done on all 7 forests in the three Lake States (Text Table 1). Due to a smaller allotment of funds in 1955 than in 1954, accomplishments were correspondingly smaller. About 47 percent of acreage covered was initial work, and 53 percent rework.

Most of the work was done by commuters working by the hour. A camp of 30 to 35 men was operated on the Gunflint District of the Superior from about June 20 to August 15. On the Lower Michigan and part of the Ottawa National Forests 13 ribes eradication contracts involving 9,830 acres and costing $2,605 were awarded and successfully completed.

Checking on adequacy of ribes eradication showed that excellent work was performed in 1955. Of the 29,296 acres worked, all but 80 acres passed as satisfactory.

Canker Pruning

Canker pruning, to save infected pines in infected stands by removal of side cankers before they reach the trunks, was done on the Ottawa and Chippewa National Forests. A total of 9,750 cankers was removed to save 5,900 trees. Canker pruning on the Ottawa was of particular interest. A free use permit to gather Christmas greens from the Green Plantation was issued to a local commercial operator. One of the requirements was the removal of branch cankers above as well as below the youngest whorl removed. A preliminary check showed that cankered branches were not overlooked.

Status of Control

In Text Table 2 the status of control on national forests at the end of 1955 is shown. Through surveys approximately 15,000 acres of white pine, and 25,000 acres of control area were added to the problem in 1955. These increases were chiefly on the Lower Michigan, Superior and Chequamegon National Forests. Acreage added in 1955 so far exceeded acreage initially worked that at the end of 1955 there were about 9,000 more acres to be initially worked than at the end of 1954.

Approximately 6,000 acres of control area were placed on maintenance in 1955. At present, of the 352,000 acres of total control area, 90 percent has been initially worked, and 67 percent is on maintenance.

The biggest job remaining is control work on the Superior where inaccessibility, high wage rates, many ribes and favorable rust conditions make eradication costly and difficult. The Chequamegon is second in having the largest workload remaining. Although there is a substantial acreage of new white pine to be initially protected on the Lower Michigan, ribes are relatively not abundant, and acreage can be worked quite cheaply. On most of the other forests, the major job remaining is necessary rework and to maintain ribes suppressed conditions on areas where control has been accomplished.

Status of Control by Forests

Separate detailed reports for each forest have been prepared and distributed to the appropriate Forest Supervisor. In the 1954

Regional Annual Report resumes of the status of control for each forest are given. There was no material change in 1955, and similar resumes are not given in this report. The reader is referred to sources mentioned for further details for each forest.

Work Plans

Work plans for each forest, for the period January to June, 1956, and for the Fiscal Year 1957, are shown in summary in Text Table 3. These estimates are based on details given in each separate forest report. Cost estimates are for field work, exclusive of overhead and common services. The estimates are realistic. They are on the basis of expected funds available, rather than funds needed for all the work which should be done.

Text Table 1. Local Control on National Forests

North Central Region, Calendar Year 1955

National Forest	Number of Areas Worked	Acres of White Pine Protected	Acres of Control Area Worked	Ribes Bushes Destroyed	Man-Days Used
Initial Work					
Huron, Mich.	13	1,185	2,465	39,391	147
Manistee, Mich.	17	1,610	3,575	8,410	52
Hiawatha, Mich.	5	1,360	3,190	9,999	139
Ottawa, Mich.	1	130	420	1,043	33
Superior, Minn.	9	416	923	59,080	444
Chippewa, Minn.	4	190	287	17,210	78
Chequamegon, Wis.	10	2,110	2,776	159,547	1,009
Nicolet, Wis.	2	245	590	8,913	178
Total, Initial	61	7,246	14,226	303,593	2,030
Rework					
Huron, Mich.	3	2,105	3,015	4,788	47
Manistee, Mich.	4	1,330	1,915	3,000	37
Hiawatha, Mich.	6	1,407	3,000	64,853	288
Ottawa, Mich.	10	790	2,020	49,402	353
Superior, Minn.	19	1,586	2,406	165,123	1,240
Chippewa, Minn.	8	359	574	37,928	304
Chequamegon, Wis.	5	974	2,151	21,520	439
Nicolet, Wis.	2	400	625	10,060	142
Total, Rework	57	8,951	15,706	356,674	2,850
All Work					
Huron, Mich.	16	3,290	5,480	44,179	194
Manistee, Mich.	21	2,940	5,490	11,410	89
Hiawatha, Mich.	11	2,767	6,190	74,852	427
Ottawa, Mich.	11	920	2,440	50,445	386
Superior, Minn.	28	2,002	3,329	224,203	1,684
Chippewa, Minn.	12	549	861	55,138	382
Chequamegon, Wis.	15	3,084	4,927	181,067	1,448
Nicolet, Wis.	4	645	1,215	18,973	320
Total, All Work	118	16,197	29,932	660,267	4,930

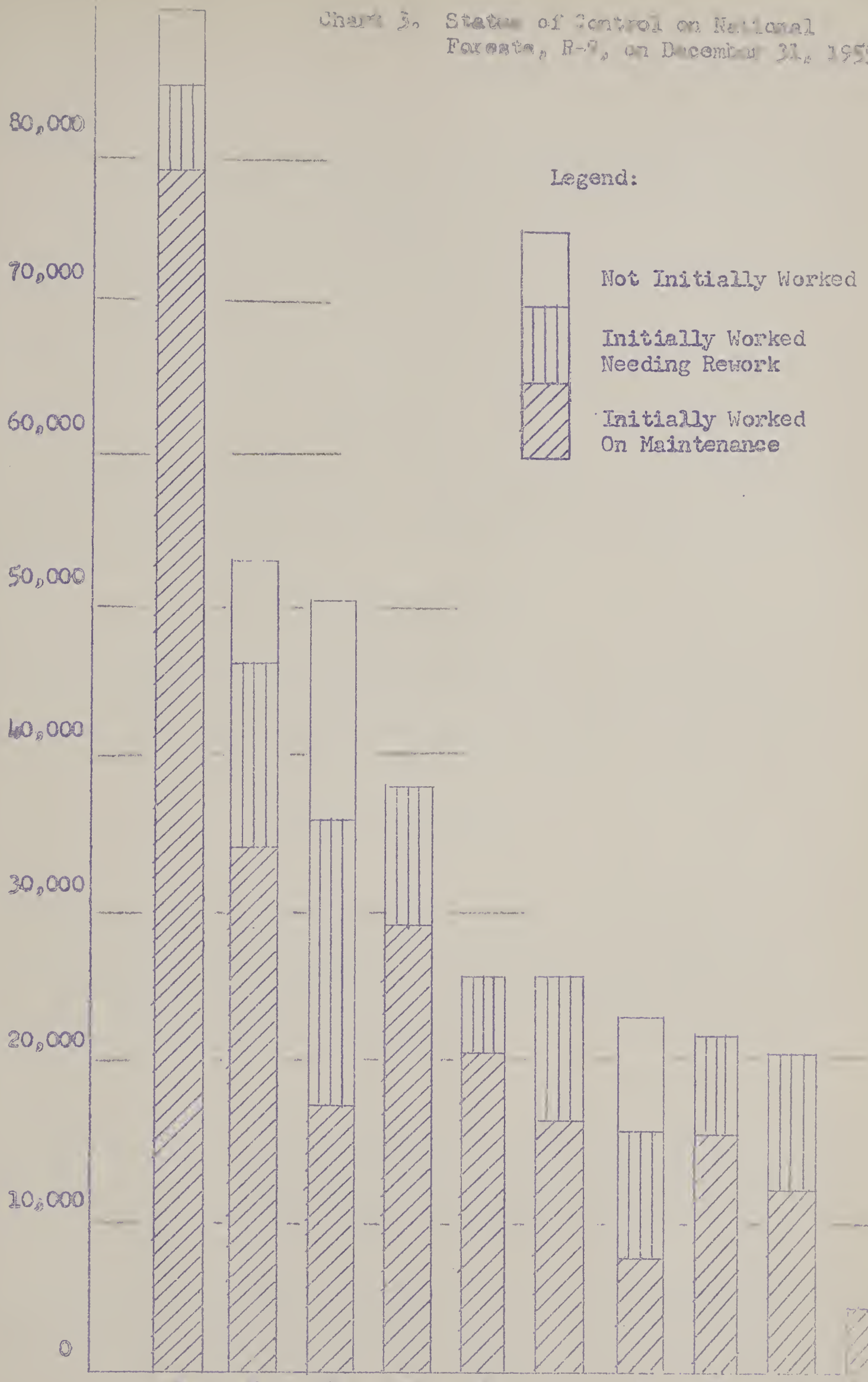
Text Table 2. Status of Control on National Forests, R-9, on December 31, 1955

National Forest	Total Acres		Acres Initially Worked		Percent Control Area		Acres Control Area Requiring:		
	White Pine	Control Area	White Pine	Control Area	Initially Worked	On Maintenance	Initial Work	Rework	Maintenance Work
Hoosier, Ind.	18	179	18	179	100.0	100.0	0	0	179
Wayne, Ohio	515	4,029	515	4,029	100.0	100.0	0	0	4,029
Huron, Mich.	11,052	22,899	6,944	15,499	67.7	33.6	7,400	7,805	7,694
Manistee, Mich.	31,625	88,983	28,895	83,778	94.2	87.9	5,205	5,518	78,260
Hiawatha, Mich.	14,899	38,761	14,899	38,761	100.0	81.4	0	9,695	29,066
Marquette, Mich.	11,702	25,720	11,702	25,720	100.0	75.0	0	4,778	20,942
Ottawa, Mich.	10,783	20,415	10,783	20,415	100.0	58.2	0	8,527	11,888
Superior, Minn.	34,967	50,481	26,086	36,148	71.6	34.1	14,333	18,948	17,200
Chippewa, Minn.	12,925	21,844	12,910	21,787	99.7	71.0	57	6,283	15,504
Chequamegon, Wis.	32,962	53,276	28,489	45,744	85.9	64.5	7,532	11,407	34,337
Nicolet, Wis.	13,148	25,711	13,148	25,711	100.0	63.5	0	9,378	16,333
Totals	174,596	352,293	154,389	317,771	90.2	65.6	34,527	82,339	235,432

Text Table 3. Work Plan for National Forests, Last Half F.Y. 1956, and F.Y. 1957

National Forest	January-June, 1956			Fiscal Year 1957		
	Acres to be Worked	Man-Days Used	Estimated Costs Field Work Only	Acres to be Worked	Man-Days Used	Estimated Costs Field Work Only
Lower Michigan	2,265	75	1,150	5,725	190	2,850
Upper Michigan	5,275	262	3,950	2,738	257	3,900
Ottawa	2,705	398	6,000	1,682	450	6,750
Superior	1,510	275	4,710	6,500	2,800	40,900
Chippewa	300	90	950	2,085	400	5,600
Chequamegon	650	120	1,456	4,175	1,785	18,700
Nicolet	1,450	330	3,330	1,950	595	6,400
Totals	14,155	1,550	21,546	24,855	6,477	85,100

Chart 3. Status of Control on National Forests, R-9, on December 31, 1952



Blister Rust Control on Indian Reservations

North Central Region, 1955

Objective

The objective is to establish and maintain blister rust protection around white pine stands of economic value on Indian Reservations. This involves suppression of ribes within infecting distances of white pine stands, and maintenance of these conditions.

Organization of Work

As in the past, the Indian Service is responsible for the selection of areas to be protected and the employment of Indian labor and field supervision. The Forest Service, through the BRC organization, has the responsibility of preparing work plans and maps, training, checking on adequacy of work, keeping records, and making periodic reports.

Current Work, 1955

Surveys

As a result of pre-eradication surveys, and post-check, there was an increase over 1954 of 1,789 acres of white pine to be protected by removal of ribes from 2,440 acres of control area. These increases were of natural reproduction, chiefly on the Menominee, Lac Court Oreilles, and Red Lake Reservations. Application of these data to the status of control is shown in Text Table 5.

Local Control

As shown in Text Table 4, ribes eradication was performed by Indian labor on 40 areas on 5 Reservations, according to work plans. Indian women were employed on the Menominee, and Indian men on all other Reservations. In order to concentrate efforts during the optimum period of the year, most of the work was done from May 15 to June 30.

Rework was done on all 5 Reservations. The only initial eradication was on 4 areas on the Menominee Reservation. About 2,000 acres of control area were placed on maintenance in 1955.

Status of Control

In Text Table 5 the present status of control on 11 Reservations is shown. Control work is on schedule, with 96.6 percent of the 140,540 acres initially worked, and 77.6 percent on maintenance. Initial work is completed on the Sac-Fox, Grand Portage, Vermilion, Nett Lake, White Earth, and Lac du Flambeau Reservations. Control has been accomplished, and only maintenance workings are needed on the Vermilion and Lac du Flambeau Reservations. No acreage has been placed on maintenance on the Grand Portage Reservation because of the recurrence of ribes in narrow stream types, and the extremely favorable climate for rust development.

Work Plans

While the long-time work plan prepared in 1943 and revised in 1949 is being followed, the increase in pine acreage, and increased wage rates require a small revision upward. In Text Table 6 are shown our best estimates of work planned in the spring of 1956, and in Fiscal Year 1957, on the basis of expected funds. These estimates are based on detailed work plans given in subsidiary reports for each Reservation.

Status of Control by Reservations

No resume of control status by Reservations is given in this report. Text Table 5 and Chart 4 show this information. There was no major change in status in 1955. The reader is referred to the 1954 report for detailed statements for each Reservation.

Text Table 4. Local Control on Indian Reservations, North Central Region, Calendar Year, 1955

Indian Reservation	Number of Areas Worked	Acres of White Pine Protected	Acres of Control Area Worked	Ribes Bushes Destroyed	Man-Days Used
Initial Work					
Menominee, Wis.	4	550	680	19,162	309
Rework					
Leech Lake, Minn.	1	67	120	24,730	105
White Earth, Minn.	1	130	168	41,684	210
Red Lake, Minn.	20	1,760	2,840	31,968	517
Lac Court Oreilles, Wis.	11	1,218	2,227	66,299	652
Menominee, Wis.	3	535	865	47,921	451
Total, Rework	36	3,710	6,220	212,602	1,933
All Work					
Leech Lake, Minn.	1	67	120	24,730	105
White Earth, Minn.	1	130	168	41,684	210
Red Lake, Minn.	20	1,760	2,840	31,968	517
Lac Court Oreilles, Wis.	11	1,218	2,227	66,299	652
Menominee, Wis.	7	1,085	1,745	67,383	760
Total, All Work	40	4,260	7,100	232,064	2,242

Text Table 5. Status of Control on Indian Reservations, North Central Region, on December 31, 1955

Indian Reservation	Total Acres		Acres Initially Worked		Percent Control Area		Acres Control Area Requiring		
	White Pine	Control Area	White Pine	Control Area	Initially Worked	On Maintenance	Initial Work	Rework	Maintenance Work
Sac-Fox, Iowa	50	500	50	500	100.0	41.2	0	294	206
Grand Portage, Minn.	1,097	1,496	1,097	1,496	100.0	0.0	0	1,496	0
Leech Lake, Minn.	1,094	1,639	1,080	1,596	97.4	65.5	43	523	1,073
Nett Lake, Minn.	5,212	7,079	5,212	7,079	100.0	88.1	0	841	6,238
Vermilion, Minn.	78	186	78	186	100.0	100.0	0	0	186
White Earth, Minn.	502	1,056	502	1,056	100.0	51.6	0	511	545
Red Lake, Minn.	12,808	19,443	12,293	18,635	95.8	76.1	808	3,846	14,789
Bad River, Wis.	8,547	15,023	8,451	14,846	98.8	90.0	177	1,327	13,519
Lac Court Oreilles, Wis.	15,174	26,685	14,025	25,208	94.5	85.1	1,477	2,506	22,702
Lac du Flambeau, Wis.	14,411	26,001	14,411	26,001	100.0	100.0	0	0	26,001
Menominee, Wis.	24,685	41,432	23,502	39,147	94.5	57.4	2,285	15,377	23,770
Totals	83,658	140,540	80,701	135,750	96.6	77.6	4,790	26,721	109,029

Text Table 6. Work Plans for Indian Reservations, North Central Region, Last Half, F.Y. 1956, and Full F.Y. 1957

Indian Agency	January-June, 1956			Fiscal Year, 1957		
	Acres to Work	Man-Days Needed	Estimated Costs	Acres to Work	Man-Days Needed	Estimated Costs
Consolidated Chippewa						
Nett Lake	2,000	200	$ 2,296	2,000	210	$ 2,400
Vermilion	10 *	9	104	-	-	-
Red Lake	3,000	465	6,525	4,000	600	8,900
Great Lakes Agency						
Lac Court Oreilles	3,750	1,100	11,000	4,200	800	8,000
Menominee Agency	2,460	880	8,800 **	3,215	889	8,800 **
Totals	11,220	2,654	28,725	13,415	2,499	28,100

* To clean up one bad ribes spot
** Half gratuity, half Menominee Tribal funds

Chart 4. Status of Control on Indian Reservations, R-9, on December 31, 1955

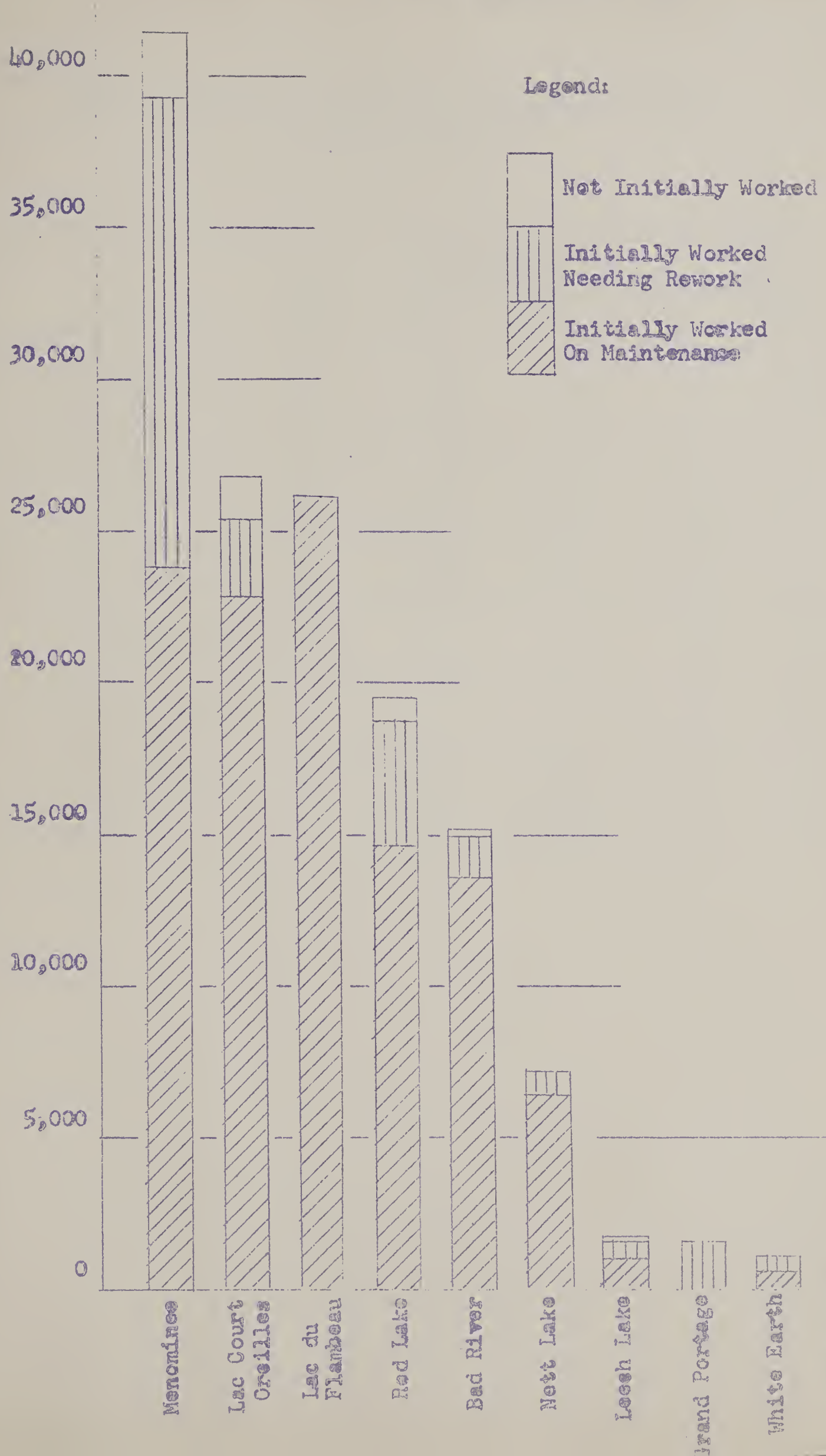


Table 1. Surveys Performed in North Central Region, Calendar Year, 1955

State	Type of Survey	No. of Areas Mapped	Acres Mapped Previously		Total Acres Mapped, Net		Man Days Used
			White Pine	Control Area	White Pine	Control Area	
Illinois	Pre-eradication	14	89	423	239	1,161	14
	Post-Check	5	92	571	166	558	
	Total	19	181	994	405	1,719	
Iowa	Post-Check	3	66	380	66	380	3
Michigan	Pre-eradication	101	567	1,343	10,481	20,629	72
	Post-Check	87	12,324	27,968	15,076	27,921	89
	Total	188	12,891	29,311	25,557	48,550	161
Minnesota	Pre-eradication	76	836	1,815	5,035	9,256	177
	Post-Check	47	5,509	9,823	6,449	10,482	74
	Total	123	6,345	11,638	11,484	19,738	251
Ohio	Pre-eradication	12	-	-	233	674	6
	Post-Check	24	615	9,835	666	2,888	11
	Total	36	615	9,835	899	3,562	17
Wisconsin	Pre-eradication	91	-	-	23,289	65,921	187
	Post-Check	113	19,495	39,907	21,141	40,257	190
	Total	204	19,495	39,907	44,430	106,178	377
Region	Pre-eradication	294	1,492	3,581	39,277	97,641	456
	Post-Check	279	38,101	88,484	43,564	82,486	372
	Total	573	39,593	92,065	82,841	180,127	828

Table 2. Summary of Local Control by States and Ownership Classes
North Central Region, Calendar Year 1955

State	Ownership Class	Number Areas Worked	Acres White Pine Protected	Acres Control Area Worked	Ribes Destroyed	Man-Days Used
			Initial Work			
Illinois	Private	1	34	46	670	2
	Non-Fed. Public	8	154	773	51	8
	Total	9	188	819	721	10
Michigan	Private	19	1,019	2,440	15,979	211
	Non-Fed. Public	38	4,642	8,582	202,918	1,125
	Nat. Forests	36	4,285	9,650	58,843	371
	Total	93	9,946	20,672	277,740	1,707
Minnesota	Private	6	67	240	16,732	43
	Non-Fed. Public	2	58	104	11,631	95
	Nat. Forests	13	606	1,210	76,290	522
	Total	21	731	1,554	104,653	660
Ohio	Private	8	104	404	23	4
	Non-Fed. Public	4	129	270	377	7
	Total	12	233	674	400	11
Wisconsin	Private	10	12,308	36,809	37,551	376
	Non-Fed. Public	14	2,306	5,391	137,508	1,118
	Nat. Forests	12	2,355	3,366	168,460	1,187
	Ind. Reserv.	4	550	880	19,462	309
	Total	40	17,519	46,446	362,981	2,990
Region	Private	44	13,532	39,939	70,955	636
	Non-Fed. Public	66	7,289	15,120	352,485	2,353
	Nat. Forests	61	7,246	14,226	303,593	2,080
	Ind. Reserv.	4	550	880	19,462	309
	Total	175	28,617	70,165	746,495	5,378
			Rework			
Illinois	Non-Fed. Public	4	161	551	1,106	8
Iowa	Non-Fed. Public	3	65	365	16,726	176
Michigan	Private	24	3,655	6,295	56,657	790
	Non-Fed. Public	26	7,809	14,408	143,789	1,197
	Nat. Forests	23	5,632	9,950	122,043	725
	Total	73	17,096	30,653	322,489	2,712
Minnesota	Private	6	365	714	57,874	256
	Non-Fed. Public	8	1,160	1,295	61,124	690
	Nat. Forests	27	1,945	2,980	203,051	1,544
	Ind. Reserv.	22	1,957	3,128	98,382	828
	Total	63	5,427	8,117	420,431	3,318
Ohio	Private	17	179	846	206	4
	Non-Fed. Public	7	487	2,042	85	7
	Total	24	666	2,388	291	11
Wisconsin	Private	8	1,115	2,035	36,635	353
	Non-Fed. Public	12	1,297	3,644	91,042	839
	Nat. Forests	7	1,374	2,776	31,580	581
	Ind. Reserv.	14	1,753	3,092	114,220	1,105
	Total	41	5,539	11,547	273,477	2,878
Region	Private	55	5,314	9,890	151,372	1,403
	Non-Fed. Public	60	10,979	22,305	313,872	2,917
	Nat. Forests	57	8,951	15,706	356,674	2,850
	Ind. Reserv.	36	3,710	6,220	212,602	1,933
	Total	208	28,954	54,121	1,034,520	9,103

Table 2. (cont'd.) Summary of Local Control by States and Operating Classes, North Central Region, Calendar Year 1955

State	Ownership Class	Number Areas Worked	Acres White Pine Protected	Acres Control Area Worked	Ribes Destroyed	Man-Days Used
			All Work			
Illinois	Private	1	34	46	670	2
	Non-Fed. Public	12	315	1,324	1,157	16
	Total	13	349	1,370	1,827	18
Iowa	Non-Fed. Public	3	65	365	15,726	176
Michigan	Private	43	4,674	8,735	72,636	1,001
	Non-Fed. Public	64	12,451	22,990	346,707	2,322
	Nat. Forests	59	9,917	19,600	180,886	1,096
	Total	166	27,042	51,325	600,229	4,419
Minnesota	Private	12	432	954	74,606	299
	Non-Fed. Public	10	1,218	1,399	72,755	785
	Nat. Forests	40	2,551	4,190	279,341	2,066
	Ind. Reserv.	22	1,957	3,128	98,382	828
	Total	84	6,158	9,671	525,084	3,978
Ohio	Private	25	283	1,250	229	8
	Non-Fed. Public	11	616	2,312	462	14
	Total	36	899	3,562	691	22
Wisconsin	Private	18	13,423	38,844	74,186	729
	Non-Fed. Public	26	3,603	9,035	228,550	1,957
	Nat. Forests	19	3,729	6,142	200,040	1,768
	Ind. Reserv.	18	2,303	3,972	133,682	1,414
	Total	81	23,058	57,993	636,458	5,868
Region	Private	99	18,846	49,829	222,327	2,039
	Non-Fed. Public	126	18,268	37,425	666,357	5,270
	Nat. Forests	118	16,197	29,932	660,267	4,930
	Ind. Reserv.	40	4,260	7,100	232,064	2,242
	Total	323	57,571	124,286	1,781,015	14,481

Table 3. Results of Checking After Ribes Eradication by States and Ownership Classes
North Central Region, Calendar Year 1955

State	Ownership Class	Number of Areas	Acres Worked and Checked	Strip Acres	Acres Worked Classified on Basis of Ribes F.L.S. per Acre Remaining After Working		
					0-15, F.L.S.	15.1-25 F.L.S.	Over 25 F.L.S.
Illinois	State-Private	11	1,727	21[illegible]	1,530		197
Michigan	State-Private	89	29,833	338.60	29,198	530	105
	Nat. Forests	54	19,180	270.80	19,100	-	80
	Total	143	[illegible]	[illegible]	[illegible]	530	185
Minnesota	State-Private	18	2,284	88.74	2,182	102	-
	Nat. Forests	40	4,190	124.44	4,128	62	-
	Ind. Reserv.	2	288	16.14	288	-	-
	Total	60	6,762	229.32	6,598	164	
Ohio	State-Private	23	3,184	51.[illegible]	3,372	62	-
Wisconsin	State-Private	42	46,971	932.00	46,702	269	-
	Nat. Forests	17	5,926	252.40	5,926	-	-
	Ind. Reserv.	15	3,142	49.90	2,832	310	-
	Total	74	56,039	1,234.30	55,460	579	
Region	State-Private	196	84,272	1,625.14	82,984	986	302
	Nat. Forests	111	29,296	647.64	29,154	62	80
	Ind. Reserv.	17	3,430	66.04	3,120	310	-
	Total	324	116,998	2,338.82	115,258	1,358	382

Table 4. Status of Control by States and Districts, North Central Region, on December 31, 1955 - Net Acres

District	Total Acres: White Pine	Total Acres: Control Area	Acres Initially Worked: White Pine	Acres Initially Worked: Control Area	Percent Control Area: Initially Worked	Percent Control Area: On Maintenance	Acres Control Area Requiring: Initial Work	Acres Control Area Requiring: Rework	Acres Control Area Requiring: Maintenance Work
AREA I									
Iowa									
Entire State	3,144	14,769	1,373	10,818	73.2	16.6	3,951	8,358	2,460
Minnesota									
Duluth	107,313	252,295	65,879	153,992	61.0	15.1	98,303	115,798	38,194
Walker	125,947	278,983	103,140	221,637	79.4	30.7	57,346	136,113	85,524
Entire State	233,260	531,278	169,019	375,629	70.7	23.2	155,649	251,911	123,718
Total Area I	236,404	546,047	170,692	386,447	70.8	23.1	159,600	260,269	126,178
AREA II									
Illinois									
Entire State	2,576	13,376	2,478	12,595	94.1	25.4	781	9,198	3,397
Wisconsin									
Eastern	210,505	689,917	189,892	609,449	88.3	44.6	80,468	301,448	308,001
Western	330,561	957,574	300,262	836,082	87.3	50.4	121,492	353,310	482,772
Entire State	541,066	1,647,491	490,154	1,445,531	87.7	48.0	201,960	654,758	790,773
Total Area II	543,642	1,660,867	492,632	1,458,126	87.8	47.8	202,741	663,956	794,170
AREA III									
Indiana									
Entire State	10,747	92,584	9,221	79,484	85.9	73.3	13,100	12,569	66,915
Ohio									
Entire State	22,560	178,516	18,748	155,626	87.2	59.1	22,890	50,034	105,592
Michigan									
Lower Penin.	304,547	928,032	272,982	827,348	89.2	41.9	100,684	438,204	389,144
Upper Penin.	145,163	329,933	129,649	297,203	90.1	55.8	32,730	113,013	184,190
Entire State	449,710	1,257,965	402,631	1,124,551	89.4	45.6	133,414	551,217	573,334
Total Area III	483,017	1,529,065	430,600	1,359,661	88.9	48.8	169,404	613,820	745,841
Region Total	1,263,063	3,735,979	1,094,124	3,204,234	85.8	44.6	531,745	1,538,045	1,666,189

Table 5. Status of Control by Ownership Classes, North Central Region
on December 31, 1955 - Net Acres

Forest or State	Total Acres White Pine	Total Acres Control Area	Acres Initially Worked White Pine	Acres Initially Worked Control Area	Percent Control Area Initially Worked	Percent Control Area On Maintenance	Acres Control Area Requiring Initial Work	Acres Control Area Requiring Rework	Acres Control Area Requiring Maintenance
Private									
Illinois	922	5,306	857	4,878	91.9	17.4	428	3,957	921
Indiana	7,560	74,196	6,146	61,983	83.5	68.8	12,213	10,970	51,013
Iowa	2,485	10,551	1,215	6,664	63.2	19.5	3,887	4,609	2,055
Michigan	221,766	731,898	196,204	635,553	86.8	34.5	96,345	383,364	252,189
Minnesota	110,033	316,930	76,423	222,559	70.2	15.1	94,371	174,563	47,996
Ohio	14,096	132,659	11,560	113,746	85.7	61.7	18,913	31,918	81,828
Wisconsin	277,229	1,028,656	239,117	851,402	82.8	44.8	177,254	390,825	460,577
Total, Private	634,091	2,300,196	531,522	1,896,785	82.5	39.0	403,411	1,000,206	896,579
State, County, Municipal									
Illinois	1,654	8,070	1,621	7,717	95.6	30.7	353	5,241	2,476
Indiana	3,169	18,209	3,057	17,322	95.1	86.3	887	1,599	15,723
Iowa	609	3,718	608	3,654	98.3	5.4	64	3,455	199
Michigan	147,883	329,289	133,204	304,825	92.6	52.6	24,464	131,530	173,295
Minnesota	54,544	111,124	33,338	65,087	58.6	18.2	46,037	44,900	20,187
Ohio	7,949	41,828	6,673	37,851	90.5	47.2	3,977	18,116	19,735
Wisconsin	154,910	430,707	149,011	417,472	96.9	44.9	13,235	223,938	193,534
Total, Non-Fed. Public	370,718	942,945	327,512	853,928	90.6	45.1	89,017	428,779	425,149

Table 5. (cont'd.) Status of Control by Ownership Classes, North Central Region on December 31, 1955 - Net Acres

Forest or State	Total Acres White Pine	Total Acres Control Area	Acres Initially Worked White Pine	Acres Initially Worked Control Area	Percent Control Area Initially Worked	Percent Control Area On Maintenance	Acres Control Area Requiring: Initial Work	Rework	Maintenance Work
National Forests									
Hoosier, Ind.	18	179	18	179	100.0	100.0	0	0	179
Wayne, Ohio	515	4,029	515	4,029	100.0	100.0	0	0	4,029
Huron, Mich.	11,052	22,899	6,944	15,499	67.7	33.6	7,400	7,805	7,694
Manistee, Mich.	31,625	88,983	28,895	83,778	94.2	87.9	5,205	5,518	78,260
Hiawatha, Mich.	14,899	38,761	14,899	38,761	100.0	81.4	0	9,695	29,066
Marquette, Mich.	11,702	25,720	11,702	25,720	100.0	75.0	0	4,778	20,942
Ottawa, Mich.	10,783	20,415	10,783	20,415	100.0	58.2	0	8,527	11,888
Superior, Minn.	34,967	50,481	26,086	36,148	71.6	34.1	14,333	18,948	17,200
Chippewa, Minn.	12,925	21,844	12,910	21,787	99.7	71.0	57	6,283	15,504
Chequamegon, Wis.	32,962	53,276	28,489	45,744	85.9	64.5	7,532	11,407	34,337
Nicolet, Wis.	13,148	25,711	13,148	25,711	100.0	63.5	0	9,378	16,333
Total, National Forests	174,596	352,298	154,389	317,771	90.2	66.8	34,527	82,339	235,143
Indian Reservations									
Sac Fox, Iowa	50	500	50	500	100.0	41.2	0	294	206
Grand Portage, Minn.	1,097	1,496	1,097	1,496	100.0	0.0	0	1,496	0
Leech Lake, Minn.	1,094	1,639	1,080	1,596	97.4	65.5	43	523	1,073
Nett Lake, Minn.	5,212	7,079	5,212	7,079	100.0	88.1	0	841	6,238
Vermilion, Minn.	78	186	78	186	100.0	100.0	0	0	186
White Earth, Minn.	502	1,056	502	1,056	100.0	51.6	0	511	545
Red Lake, Minn.	12,808	19,443	12,293	18,635	95.8	76.1	808	3,846	14,789
Bad River, Wis.	8,547	15,023	8,451	14,846	98.8	90.0	177	1,327	13,519
Lac Court Oreilles, Wis.	15,174	26,685	14,025	25,208	94.5	85.1	1,477	2,506	22,702
Lac du Flambeau, Wis.	14,411	26,001	14,411	26,001	100.0	100.0	0	0	26,001
Menominee, Wis.	24,685	41,432	23,502	39,147	94.5	57.4	2,285	15,377	23,770
Total, Ind. Reserv.	83,658	140,540	80,701	135,750	96.6	77.6	4,790	26,721	109,029
Grand Total, All Ownership	1,263,063	3,735,979	1,094,124	3,204,234	85.8	44.6	531,745	1,538,045	1,660,184

Table 6. Current and Cumulative Canker Pruning, North Central Region. From Inception to December 31, 1955

State	Ownership Class	No. of Areas Treated	No. of Trees Examined	No. of Trees Removed	No. of Trees Treated	No. of Cankers Removed	Man-Days Used
Calendar Year 1955							
Iowa	State	2	2,350	7	19	43	4
Mich.	State & Private	15	23,520	0	2,678	3,680	199
	Ottawa N. F.	1	8,000	1,300	1,100	3,400	15
	Totals	16	31,520	1,300	3,778	7,080	214
Minn.	Itasca St. Park	3	1,500	0	167	555	24
	Private	4	406	1	67	128	7
	Chippewa N. F.	1	24,942	1,842	4,799	6,349	28
	Totals	8	26,848	1,843	5,033	7,032	49
Totals	All	27	60,718	3,150	8,830	14,155	267
Cumulative to December 31, 1955							
Ind.	-	4	973	0	8	11	1
Iowa	-	85	67,642	929	1,028	2,373	80
Ohio	-	5	1,306	13	44	126	15
Mich.	-	382	856,876	1,820	59,849	119,726	3,927
Minn.	-	201	554,973	8,454	54,915	92,576	2,350
Wis.	-	22	451,465	5,949	34,584	45,493	625
Totals	-	699	1,933,235	17,165	150,428	260,305	6,998

* Free use permit to gather Christmas greens

Table 7. Nursery Sanitation Performed, North Central Region, 1955
(All in Wisconsin)

Name of Nursery (All State-owned)	Working	White Pine Trees in Nursery In Thousands	Acres Protected	Acres Worked	Ribes Destroyed	Man-Days Used
Boscobel	Third	2,225	130	600	99	6
Gordon	Twelfth	550	20	373	313	40
Hayward	Twelfth	1,500	80	552	12,067*	51
Trout Lake	Twelfth	300	18	269	0	2
Totals	-	4,575	248	1,794	12,479	99

* Chemical ribes eradication at edge of sanitation zone

Table 8. Approximate Number of Man-Months Employed by Months, Agencies and States
North Central Region, Calendar Year 1955

Agency	Number of Man-Months													Average Per Month
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
Illinois														
State & Private	1.0	1.0	1.1	1.2	1.1	1.0	1.0	1.0	1.1	1.1	1.0	1.0	12.6	1.0
F.S.-712	-	-	-	-	-	0.5	-	-	0.5	-	-	-	1.0	0.1
Total	1.0	1.0	1.1	1.2	1.1	1.5	1.0	1.0	1.6	1.1	1.0	1.0	13.6	1.1
Iowa														
State & Private	-	-	-	-	-	1.0	2.0	3.2	-	-	-	-	6.2	0.5
F.S.-712	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	Tr.
F.S.-432	1.0	1.0	0.5	-	-	1.3	1.0	1.0	-	-	-	1.0	6.8	0.6
Total	1.0	1.0	0.5	-	-	2.3	3.0	4.2	-	-	-	1.5	13.5	1.1
Michigan														
State & Private	2.0	2.0	2.0	2.0	21.3	39.5	37.9	37.0	29.8	12.6	4.6	1.0	191.7	16.0
F.S.-712	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	1.0	1.0	1.0	1.0	23.0	1.9
F.S.-432	-	-	-	-	1.0	4.2	5.0	5.0	4.7	1.0	1.0	-	21.9	1.8
National Forests	-	-	-	0.2	11.1	17.3	8.6	10.0	4.8	0.5	-	-	52.5	4.4
Total	4.0	4.0	4.0	4.2	35.4	64.0	54.5	55.0	40.3	15.1	6.6	2.0	289.1	24.1
Minnesota														
State & Private	-	-	-	-	14.2	9.0	13.9	3.3	1.0	-	-	-	41.4	3.5
F.S.-712	3.0	3.0	3.0	3.0	3.0	3.0	3.2	2.2	1.2	1.3	2.0	2.0	29.9	2.5
F.S.-432	-	-	0.2	0.5	0.9	4.6	3.7	3.5	1.9	1.7	0.7	0.1	17.8	1.5
National Forests	-	-	-	-	1.3	32.2	60.3	44.7	3.0	1.0	1.0	1.0	144.5	12.0
Indian Service	0.5	0.5	0.5	0.5	12.8	19.2	0.5	5.3	0.5	0.5	0.5	0.5	41.8	3.5
Total	3.5	3.5	3.7	4.0	32.2	68.0	81.6	59.0	7.6	4.5	4.2	3.6	275.4	23.0

Table 8. (cont'd.) Approximate Number of Man-Months Employed by Months, Agencies and States, North Central Region, Calendar Year 1955

Agency	Number of Man-Months													Average Per Month
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
Ohio														
State & Private	-	-	-	-	-	-	0.3	-	-	-	-	-	0.3	1.
F.S.-712	-	-	1.0	1.0	-	-	-	-	-	-	1.0	1.0	4.0	0.
F.S.-432	1.0	1.0	-	-	-	-	-	-	-	-	-	-	2.0	0.
Total	1.0	1.0	1.0	1.0	-	-	0.3	-	-	-	1.0	1.0	6.3	0.
Wisconsin														
State & Private	3.0	3.0	3.0	10.5	31.8	42.2	33.5	28.5	18.0	8.0	3.7	3.0	188.2	15.
F.S.-712	3.0	3.2	4.0	4.0	3.0	7.4	4.0	3.0	1.9	2.0	2.8	3.0	40.4	3.
F.S.-432	1.0	1.0	-	0.5	4.0	8.0	18.0	8.0	3.0	1.2	0.4	-	45.1	3.
National Forests	-	-	1.0	1.0	8.7	25.0	27.4	30.5	7.5	1.8	1.0	1.0	104.9	8.
Indian Service	-	-	1.0	1.0	12.9	25.6	3.7	10.8	1.0	1.0	0.6	-	57.6	4.
Total	7.0	7.2	9.0	17.0	60.4	108.2	86.6	80.8	30.5	14.0	8.5	7.0	436.2	36.
Project Office														
F.S.-712	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	30.0	2.
Total Region														
State & Private	6.0	6.0	6.1	13.7	68.4	92.7	88.6	73.0	49.9	21.7	9.3	5.0	440.4	36.
F.S.-712	10.0	10.2	12.0	13.0	11.0	16.9	13.2	11.2	6.7	6.3	8.8	9.5	128.8	10.
F.S.-432	3.0	3.0	0.7	1.0	5.9	18.1	27.7	17.5	9.6	3.9	2.1	1.1	93.6	7.
National Forests	-	-	1.0	1.2	21.1	74.5	96.3	85.2	15.3	3.3	2.0	2.0	301.9	25.
Indian Service	0.5	0.5	1.5	1.5	25.7	44.8	4.2	16.1	1.5	1.5	1.1	0.5	99.4	8.
Regional Total	19.5	19.7	21.3	30.4	132.1	247.0	230.0	203.0	83.0	36.7	23.3	18.1	1064.1	88.

Table 9. Expenditures, North Central Region, by States and Sources, Calendar Year 1955

Source of Funds	Illinois	Iowa	Michigan	Minnesota	Ohio	Wisconsin	Project Office	Total
State Indirect Aid								
January-June	$ 280	$ 460	$ 675	$ 1,750	$ 432	$ 8,100	$ -	$ 11,697
July-December	210	480	675	1,750	432	8,100	-	11,647
State Direct Aid								
January-June	3,162	120	17,503	5,009	300	18,558	-	44,652
July-December	2,959	878	27,984	5,573	374	22,122	-	59,890
Sub total, State	6,611	1,938	46,837	14,082	1,538	56,880		127,886
Forest Service 712								
January-June	-	1,024	8,520	10,514	1,037	12,712	12,579(a)	46,386
July-December	340	299	7,935	8,152	978	8,795	14,000(b)	40,499
Forest Service 432								
January-June	-	283	3,286	1,336	194	4,755	-	9,854
July-December	-	1,269	7,337	3,501	550	7,338	700(c)	20,695
National Forests								
January-June	-	-	7,704	11,763	-	6,706	-	26,173
July-December	-	-	6,405	33,850	-	16,992	-	57,247
Indian Service								
January-June	-	-	-	6,335	-	9,516	-	15,851
July-December	-	-	-	4,263	-	4,044	-	8,307
Sub-total, Federal	340	2,875	41,187	79,714	2,759	70,858	27,279	225,012
All Funds								
January-June	3,442	1,887	37,688	36,707	1,963	60,347	12,579	154,613
July-December	3,509	2,926	50,336	57,089	2,334	67,391	14,700	198,285
Grand Total	6,951	4,813	88,024	93,796	4,297	127,738	27,279	352,898

(a) Includes $798 of Common Services
(b) Includes $3,000 of Common Services
(c) All Common Services

Table 9A. North Central Region Expenditures, by State and Activity, Calendar Year 1955

State	Program Planning Direction	Surveys, Checking	Ribes Eradication	Nursery Protection	Canker Pruning	Methods Studies	Educational Work	Total	Percent Each State
Illinois	$ 1,430	$ 420	$ 400	$ -	$ -	$ 1,150	$ 3,551	$ 6,951	
Iowa	1,962	100	2,351	300	100	-	-	4,813	1
Michigan	8,585	9,085	67,264	-	2,140	-	950	88,024	24
Minnesota	10,986	12,753	64,147	500	710	2,919	1,781	93,796	26
Ohio	960	1,463	770	504	-	-	600	4,297	1
Wisconsin	7,580	10,699	90,568	1,241	-	15,500	2,150	127,738	36
Project Office	22,279	-	-	-	-	4,000	1,000	27,279	7
Total	53,782	34,520	225,500	2,545	2,950	23,569	10,032	352,898	100

Table 9B. North Central Region Expenditures, by Source of Funds and Activity, Calendar Year 1955

Source of Funds	Program Planning Direction	Surveys, Checking	Ribes Eradication	Nursery Protection	Canker Pruning	Methods Studies	Educational Work	Total	Percent Each Fund
State, Indirect Aid	$ 7,240	$ -	$ -	$ 1,304	$ -	$ 14,400	$ 400	$ 23,344	6.6
State, Direct Aid	1,536	9,175	83,217	1,166	2,061	2,786	4,601	104,542	29
F.S.-712	43,935	12,866	18,569	75	64	6,369	5,007	86,885	24
F.S.-432	1,071	3,761	25,198	-	481	14	24	30,549	8
National Forests	-	8,718	74,358	-	344	-	-	83,420	23
Indian Service	-	-	24,158	-	-	-	-	24,158	6
Total	53,782	34,520	225,500	2,545	2,950	23,569	10,032	352,898	
Percent Each Activity	15.2%	9.8%	63.9%	0.7%	0.8%	6.7%	2.9%		100

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